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June 6, 2018

To: Steve Bullock

From: David Markley

Subject: Costco Home Office Buildings 4 and 5 Traffic Analysis  
Response to Issaquah staff Comments 01

TSI has prepared a revised Traffic Study to respond to City of Issaquah comments and questions. The following table provides a summary of City staff comments with a summary response indicating the way these comments have been addressed in the revised traffic study.

Issaquah Staff Comment	TSI Response
1. In order to have a better understanding of traffic operations, queuing at driveway locations, etc., the AM peak hour analysis should also be included in the report.	An AM peak hour analysis is included in the update.
2. Traffic counts should be collected during the school year not in the summer time.	TSI collected school year traffic counts at Lake Drive and 10th Ave and adjusted the non-school year volume accordingly.
3. The ITE Trip Generation rates/employee should be used to determine the number of project trips.	The trip generation for the Costco Headquarters campus was based on actual traffic counts at the campus. This method is consistent with both the approach used in the Development Agreement as well as the generally accepted and recommended practice in the User Manual of the ITE Trip Generation Manual. The trip generation used is more conservative (larger), based on current trip generating condition for Costco.
4. Pedestrian/non-motorized circulation, connectivity and safety should also be evaluated and addressed in the study. There are existing missing sidewalks; what type of non-motorized improvements is recommended as part of this project?	The report includes a section addressing pedestrian/non-motorized circulation and safety.
5. Sight distances for the proposed driveway locations should be evaluated and included in the report.	Sight distances were evaluated at the proposed new driveway locations. Exhibits are provided in an Appendix to the report.
6. The proposed driveway access on Lake Drive across from Building 4/Trading Building driveway	The proposed driveway locations relative to existing driveway locations were examined for potential

Issaquah Staff Comment	TSI Response
and the close proximity to the on-site parking garage access should be evaluated and analyzed for safety, circulation/queuing issues, etc., and addressed in the report.	turning conflicts, queuing conflicts, and pedestrian safety and are discussed in the traffic study.
7. Synchro 8 should be used for the analysis. Submit the electronic Synchro analysis files (version 8) to the City with the revised report.	Synchro 9 was used. Electronic version 8 files will be provided, as requested.
8. Since the proposed right-in/right-out Costco Warehouse access to NW Sammamish Road west of 10th Ave has not been approved by the City, the trip distribution/assignment and analyses for the future conditions scenarios should be performed without this new driveway.	The right-in/right-out access was removed for this update.
9. How is the 10th Ave Pedestrian and Traffic Safety Study related to this project? Include and discuss the pedestrian study results/recommendations in this report (i.e., signal and roundabout improvements, pedestrian safety, etc.). The Pedestrian and Traffic Safety study should be included in the Appendix of the report.	<p>The 10th Ave Study was an independent analysis that is not within the scope of this TIA. All references were removed from the updated TIA document.</p> <p>Pedestrian improvements north of the 10th Avenue at Lake Drive intersection are specifically excluded as a condition of development of Buildings 4 &amp; 5 and/or improvement of the 10th Avenue at lake Drive intersection.</p>
10. Future conditions traffic volume forecasts – Typical existing weekday volumes (non-summer/school closures) should be used for traffic model calibration.	The future traffic volumes were adjusted to reflect summer conditions, see response 2.
11. Detailed SIDRA reports should be included in the appendix.	Detailed reports are included in report Appendix.
12. The future conditions traffic forecasts/modeling assumptions should be clearly explained and included in the report.	Refer to report section 4.ii.
13. What are the assumptions for the Costco Warehouse and gas station for future conditions?	Refer to report section 4.ii.
14. Did the City's Travel Demand Modeling Consultant (CH2M) provide the forecast volumes and trip assignments for this project? What were the assumptions for future project and non-project related trip distribution/assignment?	<p>CH2M provided the forecast volumes and trip assignments for this project.</p> <p>Traffic forecasts provided by Issaquah's citywide travel demand model were used as a basis for the trip distribution used for the forecasting model. The</p>

Issaquah Staff Comment	TSI Response
	citywide model data was refined to better reflect local Traffic Analysis Zone loading and land use within Pickering Place. The Costco Home Office travel demand model for Buildings 4 & 5 is consistent with the citywide travel demand model.
15. How was the 25 percent external trip growth rate determined for the study area? Page 17, Mitigation Analysis and Recommendations Section - It was noted in the 10th Avenue Pedestrian and Traffic Safety Study that “Forecasts suggest that this signal could satisfy the four hour and peak hours signal warrants” for the intersection of Lake Drive and 10th Avenue NW. It was also noted that “While the calculated level of service appears to be quite good, observations of the Costco headquarters existing traffic volumes suggest that a traffic signal may not be able to serve surges from the Costco Headquarters garage. Likewise, if patterns or traffic volumes should shift or grow differently than forecast, the traffic signal could not respond to those changes as easily as a roundabout.” Is the roundabout improvement option the recommended mitigation measure for this intersection?	The report has been updated. The external trip growth assumptions are consistent with the citywide travel demand model, see page 12 of the updated report.  A final decision regarding the specific type of improvement will be made by Costco in conjunction with the City per the Development Agreement.
16. Provide a matrix of what the DA requires and how it will be addressed.	Refer to report section 9.
17. Provide written response to City’s comments with the revised report.	This table provides summary written responses.

If there are any questions relating to these responses we invite you or City staff to call Jeffery Hee or me, so we can provide further clarity.



## **Costco Home Office Buildings 4 and 5**

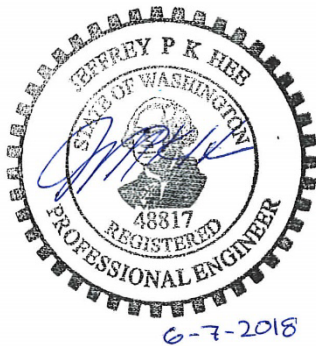
### **Traffic Analysis**

Issaquah, WA

September 2017

Revised: June 2018

Prepared for:  
the City of Issaquah  
and  
Costco Wholesale Corporation



Prepared by:  
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## 1. Executive Summary

This report documents traffic conditions associated with development of Buildings 4 and 5 of the Costco home office campus. The purpose of this traffic analysis report is to determine if the traffic impacts associated with development of Buildings 4 and 5 are consistent with the impacts and mitigation identified in the April 2015 City of Issaquah/Costco Wholesale Corporation Development Agreement (Development Agreement).

This study reflects responses to comments from the City of Issaquah, dated January 22, 2018.

Buildings 4 and 5 serve as the first phase of build-out under the Development Agreement. The Development Agreement allows for up to 1.5 million square feet of office space, 250,000 square feet of which can be commercial space, to be developed in Pickering Place.

Buildings 4 and 5 include about 601,000 square feet of office and basement space.

Buildings 4 and 5 will replace existing surface parking south of Costco Office Building 3 and Costco Trading Building. Development includes new parking garages for up to 2,000 vehicles and office space for up to 4,320 employees. For the purposes of this study, build-out is anticipated by 2026 but full occupancy is likely to extend beyond that date.

Build-out of Buildings 4 and 5 is forecast to generate 1,771 new AM peak hour trips, split 1,594 in and 177 out, and 1,512 new PM peak hour trips, split 242 in and 1,270 out.

With-development, the study intersections on Lake Drive at 11th Ave and 62nd Street operate within the City of Issaquah thresholds.

The Lake Drive and 10th Ave intersection is required to be improved to support LOS and queues. A signal and a roundabout were reviewed, and both show the intersection will operate well with either improvement. Either improvement will also improve eastbound vehicle queues on Lake Drive between 10th Ave and 11th Ave.

The driveways operate satisfactorily with the development. Vehicle delay impacts are reasonable considering the number of peak hour vehicle trips forecast. Turn restrictions at the driveways are not recommended. Vehicle queues on Lake Drive can be accommodated by turns lanes and center two-way left turn lane.

Non-motorized travel modes will be supported by a continuous network of bicycle and pedestrian facilities on Lake Drive and SE 62nd Street with linkages to between existing and future public facilities.

The Development Agreement requires a signal, or equivalent, improvement at Lake Drive and 10th Ave with build-out of at least 550,000 square feet of new office space. At Lake Drive and 10th Ave, without- and with-development queues extend beyond the eastbound left turn and westbound right turn lanes on Lake Drive. Since the intersection's LOS and V/C results with the development, satisfy Issaquah's requirement, at minimum, the turn lanes could be extended to support future vehicle queues. Since the Buildings 4 and 5 will not be occupied immediately upon construction completion, the timing of these improvements should reflect actual traffic conditions through a post occupancy traffic study.

Based on this study and these findings, the proposed development appears to generate traffic impacts that are within the scope of the April 2015 Development Agreement.

## 2. Introduction and Project Description

The purpose of this traffic analysis report is to determine if the traffic impacts associated with development of Buildings 4 and 5 are consistent with the impacts and mitigation identified in the April 2015 Development Agreement between the City of Issaquah and Costco Wholesale Corporation.

This study updates the technical analyses in response to comments from the City of Issaquah staff, dated January 22, 2018.

The technical analysis is based on future occupancy of Costco home office Buildings 4 and 5 and focuses on future traffic conditions at the campus' driveways off Lake Drive and 62nd Street and the Lake Drive intersections at 11th Ave, 10th Ave and 62nd Street.

To facilitate staff review, this report is formatted to generally follow the Issaquah's Transportation Impact Analysis guidelines.

### i. Project Location

Costco is proposing to expand their corporate home office campus in the southeast area in Pickering Place, south of NW Sammamish Drive, north of I-90, east of SR 900 and west of East Lake Sammamish Pkwy. A vicinity map showing the Costco campus and expansion area is included as Figure 1.



Figure 1: Vicinity Map – Costco Home Office Expansion



Redevelopment of the southern surface parking areas on the Costco home office campus with Buildings 4 and 5 represents the first phase of new development under the Development Agreement.

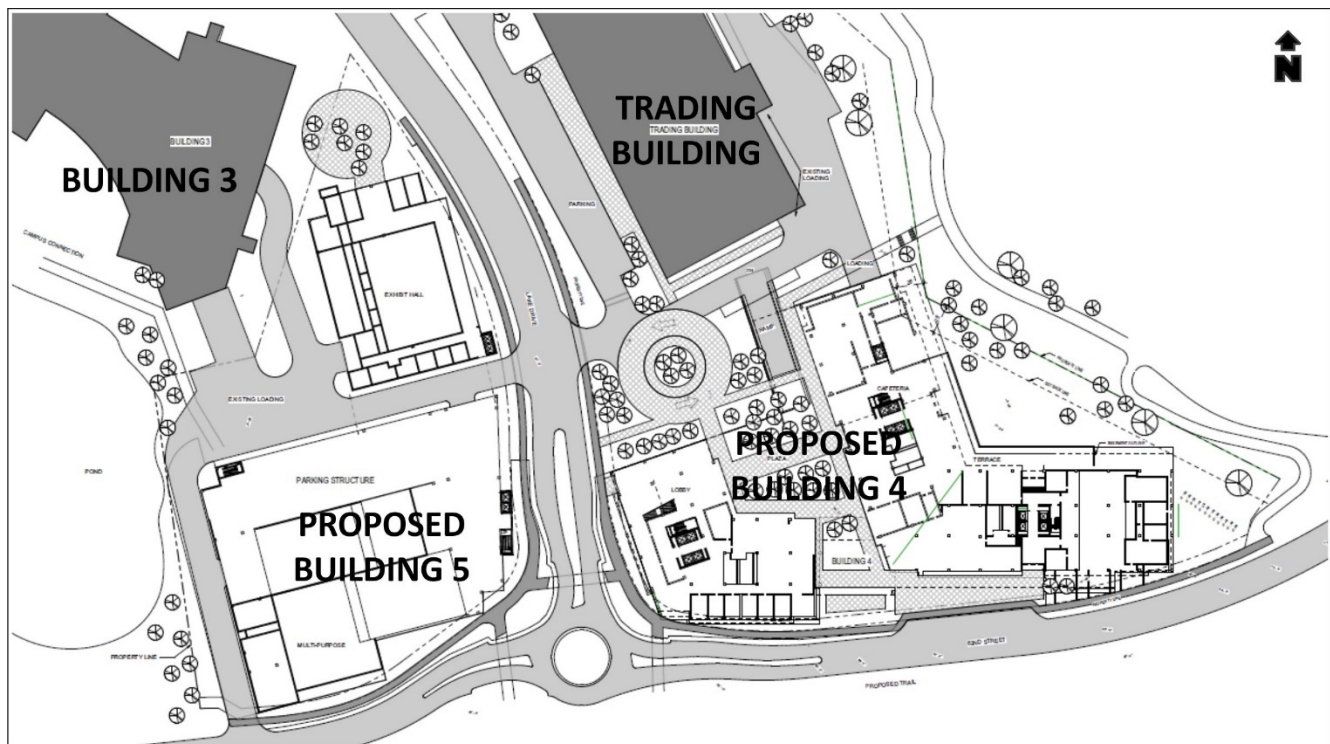
## ii. Project Description

A conceptual plan for development of Buildings 4 and 5 is included as Figure 2. With Buildings 4 and 5, existing driveways are proposed to be consolidated and sidewalks and street frontage will be improved along SE 62nd Street and Lake Drive.

**Building 4** will replace existing surface parking south of Costco Trading Building. Development includes a nine-level office building (totaling 594,522 square feet of office space), a basement level (totaling 6,745 square feet), and parking for about 200 vehicles. The new building will provide office space for up to 4,320 employees. Site development includes one shared driveway with the Trading Building off Lake Drive, and an internal driveway connection to the Trading Building and the existing Costco Garage.

**Building 5** will replace the existing surface parking south of the Costco Office Building 3. Development includes a nine-level parking structure with about 1,800 parking stalls. The site includes a fitness space for Costco employees and a north building for exhibitor space. Site development includes one driveway to Lake Drive and one driveway to 62nd Street, and an internal driveway connection to Building 3.

An overhead pedestrian bridge is also proposed to connect Buildings 4 and 5 across Lake Drive.



**Figure 2: Conceptual Site Plans Buildings 4 and 5**

Build-out of Buildings 4 and 5 is anticipated by 2026, though full occupancy is likely to extend several years. To be conservative, year 2026 was selected as the horizon year for this analysis.

### 3. Existing Conditions

This section defines the study area and documents existing traffic conditions without Buildings 4 and 5. The study area for this analysis includes the following intersections and driveways:

1. Lake Drive at 11th Ave
2. Lake Drive at West Driveway/Warehouse Driveway
3. Lake Drive at Building 2 Driveway/Warehouse Driveway
4. Lake Drive at 10th Ave
5. Lake Drive at Building 1/N Garage Driveway
6. Lake Drive at Building 3 Driveway
7. Lake Drive at Lot 5/Garage/Trading Building Driveway
8. Lake Drive at Lots 4 and 5 (Future Buildings 4 and 5)/Trading Building Driveway
9. Future Lake Drive at 62nd Street
10. 62nd Street at Lot 5 (Future Building 5) Driveway

#### i. Physical Characteristics of Study Area Street System

Major roadways within the study area described below:

- Lake Drive is classified as a local roadway in Issaquah’s Comprehensive Plan and is a Core Street in the Central Issaquah Development and Design Standards (CIDDS). Lake Drive fronts the home office campus from east of 11th Ave to 62nd Street. Lake Drive is three-lanes wide with sections of center turn lane, turn pockets at driveways and landscaped median from 11th Ave to south of the Trading Building. South of the Trading Building Lake Drive has a two-lane wide cross-section. The section of Lake Drive from 10th Ave to SE 62nd Street will be reconstructed to a three-lane cross section with bike lanes as part of the SE 62nd Street road improvements.
- 10th Ave is classified as a collector arterial in Issaquah’s Comprehensive Plan and is identified as a Core Street in the CIDDS. The roadway has a five-lane cross-section with a landscaped median between 56th Street and Lake Drive. The median is segmented to allow for left turns at Costco Warehouse and Pickering Barn.
- 62nd Street is classified as a minor arterial between East Lake Sammamish Parkway and 221st Place. A future extension of 62nd Street to Lake Drive is identified as a Core Street in the CIDDS.

The speed limit in the study area is 25 mph.

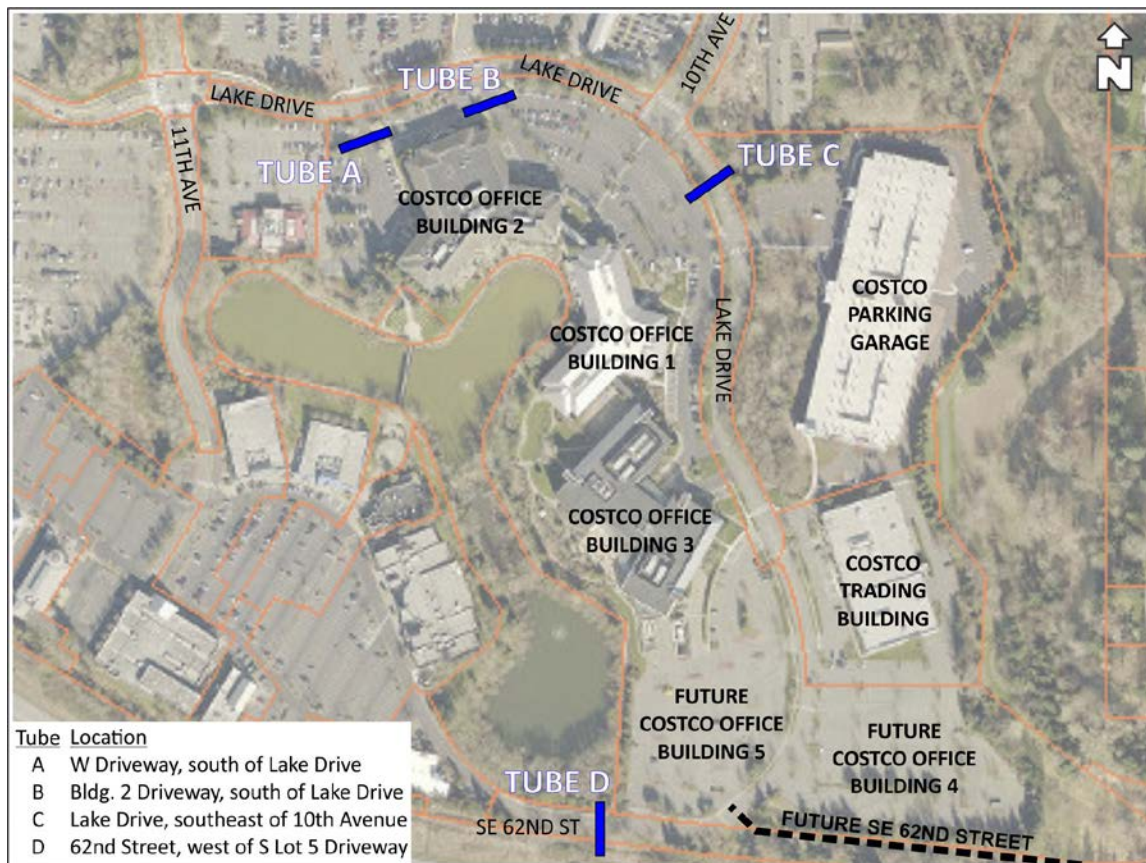
#### ii. Existing Transit Service

King County Metro Transit Route 200 provides weekday service from Issaquah Community Center to Swedish Medical Center. Route 200 services Lake Drive between 12th Ave NW and 10th Ave NW between 9:15 AM and 2:20 PM and service headways are 35 to 40 minutes.

Other local routes (Routes 217 and 269) are on 56th Street, north of the home office campus. All local routes serve the Issaquah Transit Center.

### iii. Existing Home Office Campus Trip Generation

Tube counters were located on the campus to collect existing PM peak hour trips generated by the home office. Data was collected on Wednesday, July 12, 2017, at the four locations shown on Figure 3.



**Figure 3: 2017 Home Office Campus Tube Count Location**

The tube count data is compiled in Table 1. The data showed that the existing campus' AM peak hour was between 7:15 AM and 8:15 AM and the PM peak hour was between 4:30 and 5:30 PM.

The existing campus includes 530,000 square feet of office and trading building space and is about 85% occupied. There are currently 2,800 employees on campus with a remaining capacity for 3,300 employees.

The peak hour tube count data was adjusted to reflect non-summer traffic volumes, which is discussed more in the following section. Based on the peak hour campus volumes, the following summarizes the campus' AM and PM peak hour trip generation rates.

- The AM peak hour trip rate is 0.41 trips per employee (= 1,115 AM peak hour existing campus trips X 1.021 summer adjustment factor ÷ 2,800 employees). AM peak hour trips are split 90% in and 10% out.
- The PM peak hour trip rate is 0.35 trips per employee (= 963 PM peak hour campus trips X 1.019 summer adjustment factor ÷ 2,800 employees). PM peak hour trips are split 16% in and 84% out.

These trip generation rates do not reflect anticipated the changes in vehicle mode split and average vehicle occupancy used in the City of Issaquah's long-range traffic model and therefore are a conservative over-estimate of the conditions forecast for the Development Agreement.

**Table 1: Home Office Campus Existing Volumes**

15-min Vol. Interval	Location A <sup>1</sup>		Location B <sup>1</sup>		Location C <sup>1</sup>		Location D <sup>1</sup>		Total All Locations		
	In	Out	In	Out	In	Out	In	Out	In	Out	Total
7:00-7:15 AM	17	8	30	4	160	10	23	0	230	22	252
7:15-7:30 AM	25	10	25	5	148	17	13	2	211	34	245
7:30-7:45 AM	12	6	23	5	176	12	17	1	228	24	252
7:45-8:00 AM	13	6	31	5	210	9	17	5	271	25	296
8:00-8:15 AM	10	5	42	3	231	14	14	3	297	25	322
8:15-8:30 AM	12	4	17	6	152	5	5	0	186	15	201
8:30-8:45 AM	14	3	10	1	90	6	5	0	119	10	129
8:45-9:00 AM	5	3	8	0	58	10	4	0	75	13	88
<b>AM Peak Vol.</b>	<b>60</b>	<b>27</b>	<b>121</b>	<b>18</b>	<b>765</b>	<b>52</b>	<b>61</b>	<b>11</b>	<b>1,007</b>	<b>108</b>	<b>1,115</b>
3:00-3:15 PM	8	15	11	13	26	67	4	7	49	102	151
3:15-3:30 PM	12	10	5	9	16	55	4	8	37	82	119
3:30-3:45 PM	13	24	14	10	14	127	2	16	43	177	220
3:45-4:00 PM	10	17	6	5	15	91	4	13	35	126	161
4:00-4:15 PM	11	29	6	8	18	129	1	15	36	181	217
4:15-4:30 PM	12	10	9	9	10	90	1	11	32	120	152
4:30-4:45 PM	15	31	10	6	17	147	0	16	42	200	242
4:45-5:00 PM	12	17	11	7	9	135	3	8	35	167	202
5:00-5:15 PM	15	39	10	15	16	125	2	27	43	206	249
5:15-5:30 PM	9	29	9	15	15	174	1	18	34	236	270
5:30-5:45 PM	19	20	8	14	11	110	3	6	41	150	191
5:45-6:00 PM	2	21	8	11	7	78	1	9	18	119	137
<b>PM Peak Vol.</b>	<b>51</b>	<b>116</b>	<b>40</b>	<b>43</b>	<b>57</b>	<b>581</b>	<b>6</b>	<b>69</b>	<b>154</b>	<b>809</b>	<b>963</b>

<sup>1</sup> For tube count locations, refer to Figure 3

#### iv. Existing Traffic Volumes

Initially, AM and PM peak hour turning movement volumes were collected at the study intersections on Wednesday, July 12, 2017. The City of Issaquah requested that this updated study include: AM peak hour traffic volumes and non-summer peak hour traffic volumes.

On Tuesday, February 13, 2018, AM and PM peak hour volumes were collected at Lake Drive and 10th Ave NW. These non-summer volumes were compared to the July 2017 volumes, and used to adjust the 2017 volumes to model revised existing conditions:

- The February 2018 AM peak hour volume at Lake Drive and 10th Ave NW was found to be about 2.1% higher than in July 2017 intersection volume. The existing AM peak hour study intersection volumes were increased by 2.1% to reflect non-summer conditions.
- The February 2018 PM peak hour volume at Lake Drive and 10th Ave NW was found to be about 1.9% higher than in July 2017 intersection volume. The existing PM peak hour study intersection volumes were increased by 1.9% to reflect non-summer conditions.

Figures 4 and 5 illustrate the existing peak hour study intersections traffic volumes. The traffic counts are provided in the Appendix.



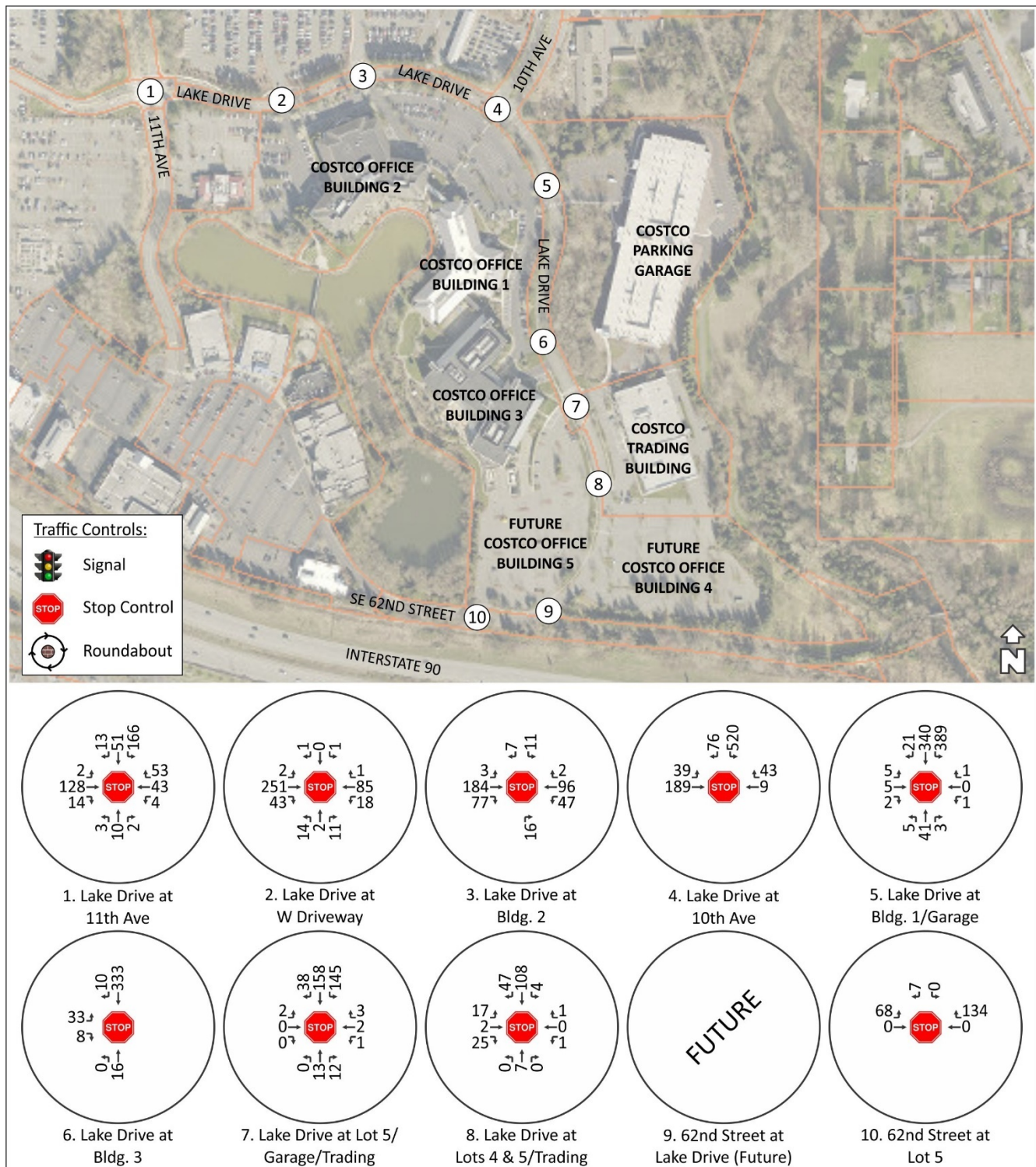


Figure 4: Existing Weekday AM Peak Hour Volumes

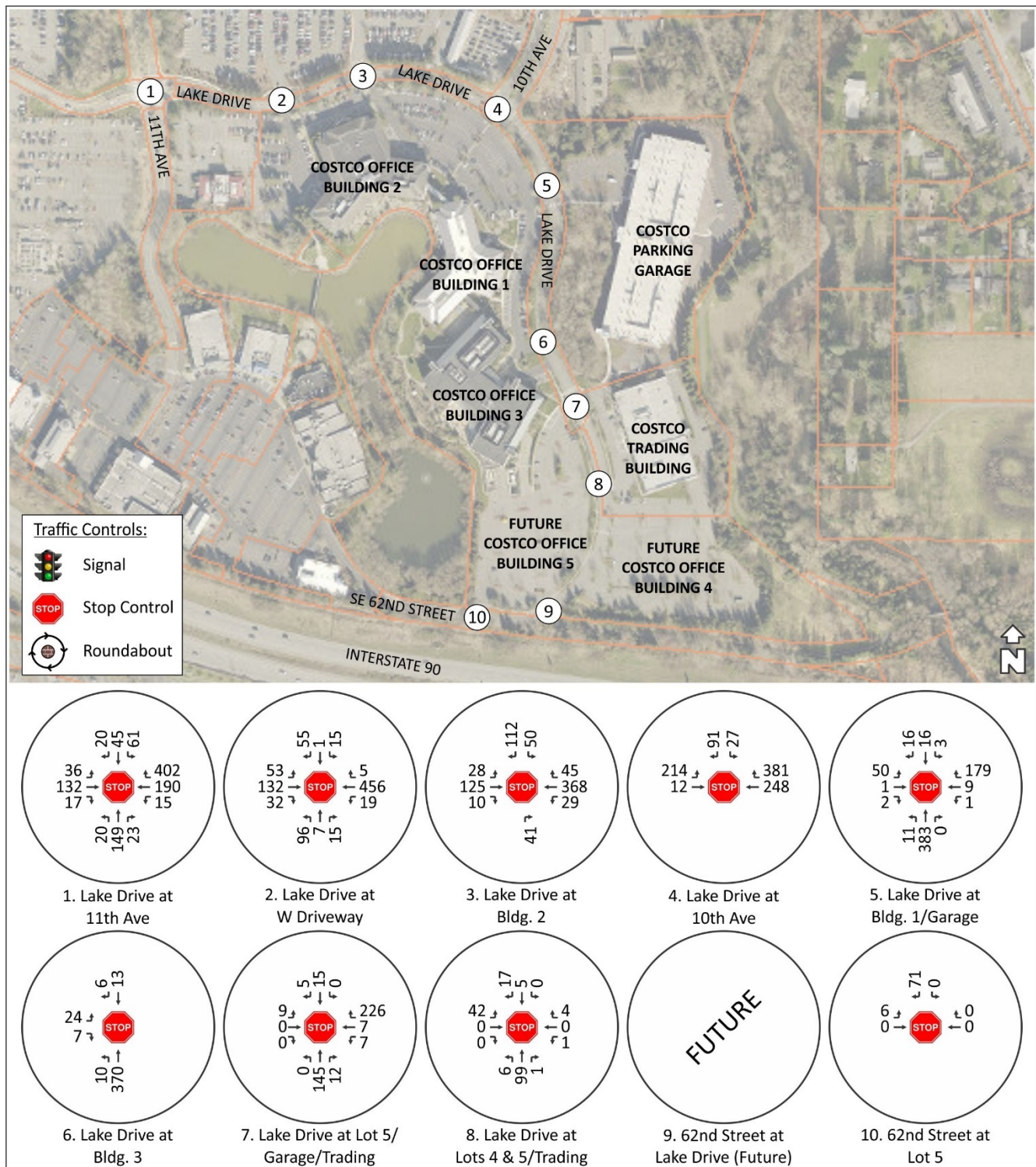


Figure 5: Existing Weekday PM Peak Hour Volumes

#### v. Existing Intersection Performance

Issaquah uses the following performance measures to assess traffic impacts at intersections and approaches on public roads:



- Intersection LOS threshold of “D”
- Individual through or shared through/turning movements V/C threshold of 0.85
- Exclusive turning movement V/C threshold of 1.0

The intersection performance analysis uses the 2010 Highway Capacity Manual (HCM) methodology to compute the LOS, delay and V/C at the study intersections. The Synchro, version 9.1, build 912, revision 4, computer program was used for the calculations.

Table 2 summarizes the existing intersection operations; corresponding capacity reports are in the Appendix.

**Table 2: Existing Level of Service**

Intersection	Control	AM Peak Hour			PM Peak Hour		
		LOS	Delay <sup>1</sup>	V/C <sup>2</sup>	LOS	Delay <sup>1</sup>	V/C <sup>2</sup>
1. Lake Dr. at 11th Ave	All Stop	B	10.8	0.41	B	14.3	0.67
2. Lake Dr. at West Drwy.	N/S Stop	B	12.2	0.06	D	30.3	0.48
3. Lake Dr. at Bldg. 2 Drwy.	N/S Stop	B	12.1	0.05	B	13.9	0.19
4. Lake Dr. at 10th Ave	All Stop	E	35.8	0.95	B	12.0	0.54
5. Lake Dr. at Bldg. 1/N Garage Drwy.	E/W Stop	F	69.5	0.27	D	26.0	0.41
6. Lake Dr. at Bldg. 3	E/W Stop	B	11.3	0.08	B	12.0	0.08
7. Lake Dr. at Lot 5/Garage/Trading Drwy.	E/W Stop	C	21.4	0.13	C	15.5	0.39
8. Lake Dr. at Lots 4 & 5/Trading Drwy.	E/W Stop	B	10.2	0.08	B	10.3	0.09
10. SE 62nd Street at Lot 5	SB Stop	A	9.0	0.05	A	8.6	0.09

<sup>1</sup> Delay is expressed in seconds of control delay

<sup>2</sup> V/C ratio of worst controlled approach

The study intersections and driveways operate at LOS “D” or better, except Lake Drive and 10th Ave and Lake Drive and Building 1/N Garage driveway.

- Lake Drive and 10th Ave NW is all-way stop sign controlled. In the AM peak hour, the intersection operates overall at LOS “E” and the southbound left turn movement operates at LOS “F”. In the PM peak hour, the intersection operates well at LOS “B”.
- At Lake Drive and Building 1/N Garage Driveway, the private driveway approaches are stop sign controlled. In the AM peak hour, the eastbound approach operates at LOS “E” and serves 12 vehicles. The westbound approach operates at LOS “F” and serves 2 vehicles. The AM peak hour driveway volumes are small, and the outbound vehicle delays are a result of the heavy southbound employee volume entering the campus. The relationship between the AM peak hour volumes exiting the private driveways and the computed delays is not considered to be significant. Further, the V/C ratios of the driveway approaches and of the left turns maneuvers from Lake Drive to the driveways does not suggest any major queuing spillover at this location. Onsite observations at this driveway show that interruptions in through traffic caused by pedestrians crossing Lake Drive result in actual queues and delay that are less than those calculated. In the PM peak hour, the driveways operate at LOS “D”.

The SE 62nd Street extension from Pickering Place to E Lake Sammamish Parkway SE, which is anticipated to be complete and open in late 2018, is anticipated to redistribute the volume on Lake Drive and reduce delays at the study intersections and driveways.

Review of the individual intersection turning movements shows that the study intersections operate with V/C ratios within the City of Issaquah standards.

## 4. Future Conditions without Buildings 4 and 5

This section documents future “baseline” traffic conditions without Buildings 4 and 5. Future baseline conditions were forecasted to year 2026 to coincide with the anticipated build-out of Buildings 4 and 5.

### i. Future Without-Development Facility Improvements

This study includes the following transportation improvements, consistent with the North Issaquah Roadway Improvements, assumed to be complete by year 2026:

- Add second southbound lane and pedestrian, stormwater, and landscaping improvements on East Lake Sammamish Pkwy between SE 56th Street and Issaquah Fall City Road and modify existing signals at Black Nugget Road and 62nd Street. Source: Issaquah Transportation Improvement Program (TIP) Project #1. Complete in 2017.
- Extend 62nd Street from East Lake Sammamish Pkwy across Issaquah Creek to Lake Drive, fronting Building 4 site, widen roadway between 221st Ave and East Lake Sammamish Pkwy, and construct roundabouts at 221st Ave and Lake Drive. Source: TIP Project #2. Complete in 2019.
- New westbound left turn lane and new northbound right turn lane at 12th Ave /SR 900/ 17th Ave intersection. Source: TIP Project #3. Complete in 2020.

A planned 11th/12th Street I-90 overcrossing was part of the City of Issaquah’s 2030 traffic modeling related to the Development Agreement. The overcrossing is not programmed for construction by 2026 and was not included as part of the road network this traffic analysis.

### ii. Future Without-Development (Non-Home Office Campus) Travel Demand Model

Future traffic volume forecasts were developed using the City of Issaquah’s Citywide Travel Demand Model to guide travel distribution, this approach is consistent with the Development Agreement.

The Citywide Travel Demand Model represents PM peak hour vehicle trips in year 2030. The Citywide Travel Demand Model was used at the basis to forecast conditions with Building 4 and 5.

The Citywide Travel Demand Model includes 255 Transportation Analysis Zones (TAZs). Vehicle trips generated by the TAZs were assigned to the model’s street network, which includes the transportation improvements listed in the previous section. The TAZs and zone connector structure of the Citywide Travel Demand Model are appropriate for citywide planning-level applications; however, for the purposes of this project-level study a more refined zone structure was required.

The Citywide Travel Demand Model was refined in the Pickering Place subarea to include nine TAZs, to represent land parcels or similar land use boundaries. The Citywide Travel Demand Model was also refined to incorporate zone connectors to more closely represent the locations of private driveways. The refined TAZs in the Costco home office travel demand model include:

1. Warehouse: Costco Warehouse
2. Fuel: Costco Membership fueling station
3. Hotel: Holiday Inn and City of Issaquah office
4. NW Retail: Retail between NW Sammamish Road, Lake Drive, 11th Ave NW and 12th Ave NW
5. SW Retail: Lowe’s Home Improvement
6. SE Office: Costco offices and Red Robin south and west of Lake Drive, includes future Building 5
7. SE Office: Costco home office Garage and Trading building, includes future Building 4

8. Barn: Pickering Barn block
9. South Retail: Retail, movie theater and medical office south of the lake and north of I-90

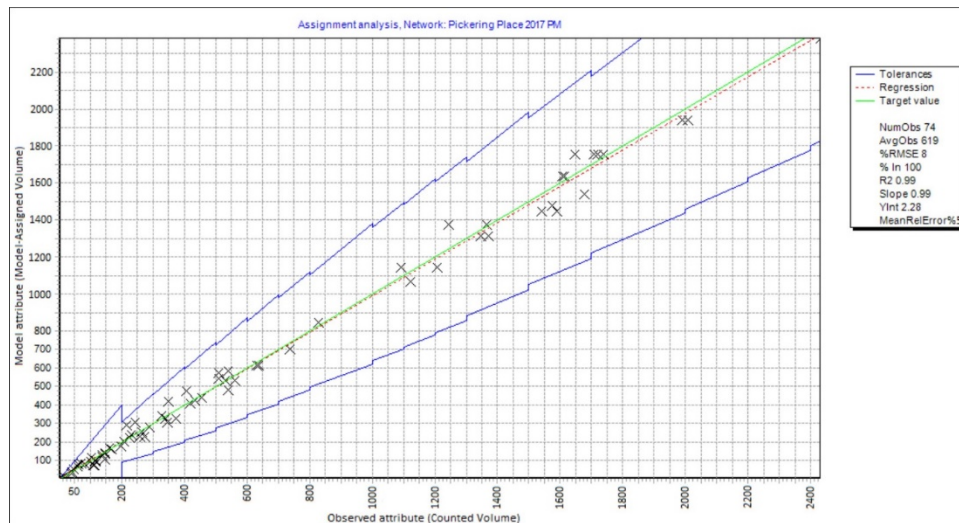
The refined TAZs within Pickering Place for the Costco home office travel demand model are shown in Figure 6.



**Figure 6: Picking Place Transportation Analysis Zones**

The Costco home office travel demand model was calibrated using the PM peak hour turning movement volumes, which were adjusted for non-summer conditions (refer to Section 3.iv). This calibrated Costco home office travel demand model included all subarea improvements completed through May 2016.

The Costco home office travel demand model calibration was compared to the 2017 volumes and is within the acceptable error thresholds per NCHRP Report 255. The coefficient of determination and root-mean-square error satisfy the demand model calibration guidelines per NCHRP Report 765 and FHWA's *Travel Model Validation and Reasonableness Checking Manual, Second Edition*. An assignment analysis plot showing the calibration constraints is shown in Figure 7. The plot shows the modeled conditions calibrate well with the traffic volumes.



**Figure 7: 2017 Existing PM Peak Hour Model Calibration Plot**

The year 2026 growth assumptions are shown in Table 3.

While there are no specific planned projects in non-Costco zones, TSI assumed that there could be some increases in trip generation due to increased growth in existing businesses and/or turnover or re-occupancy in new business that are responding to new, more active markets.

**Table 3: PM Peak Hour Land Use Growth Assumptions**

TAZ	Name	2017 PM Trips		Total Growth	2026 PM Trips	
		In	Out		In	Out
1	Warehouse	553	748	20%	664	898
2	Fuel	257	104	20%	308	125
3	Hotel	41	27	200%	123	81
4	NW Retail	184	209	50%	276	314
5	SW Retail	58	47	50%	87	71
6	SW Office	220	397	0% <sup>1</sup>	220	397
7	SE Office	11	534	0% <sup>1</sup>	11	534
8	Barn	5	5	410%	9	42
9	South Retail	58	47	281%	68	332

<sup>1</sup> TAZ's 6 and 7 include no growth at the existing parking areas, until build-out of Buildings 4 and 5

External trip growth represents a conservative 2.5 percent simple annual growth assumption for the 10-year planning horizon. This annual growth rate is consistent with the City of Issaquah's Citywide travel demand model.

During the AM peak hour, most of the traffic at Pickering Place is generated to Costco's home office campus. Most other businesses are not open during the AM peak hour. The City of Issaquah does not have a planning model for AM peak hour traffic conditions. For this study, future AM peak hour traffic includes growth related to a planned expansion of the Costco membership fueling station, minor growth internal to Pickering Place related to local businesses, and redistributed volumes related to the opening of SE 62nd Street extension.

**iii. Future Without-Development Costco Home Office Campus Traffic Growth**

The existing home office campus has 2,800 employees and capacity for up to 3,300 employees. Thus, the existing campus could add 500 employees prior to build-out of Buildings 4 and 5. The campus' peak hour trip rates, see Section 3.iv, were used to forecast the trips related to the additional employee capacity:

- 205 AM peak hour trips (0.41 trips per employee X 500 employees), split 185 in and 20 out.
- 175 PM peak hour trips (0.35 trips per employee X 500 employees), split 28 in and 147 out.

Trips at study area driveways were reassigned based on the future planned roadway improvements and the available roadway capacity.

**iv. Future Without-Development Traffic Volumes**

The travel demand model was updated to account for the projected traffic growth between now and 2026, discussed above, and traffic redistribution related to the facility improvements listed above.

Figures 8 and 9 show the year 2026 without-development peak hour traffic volumes.



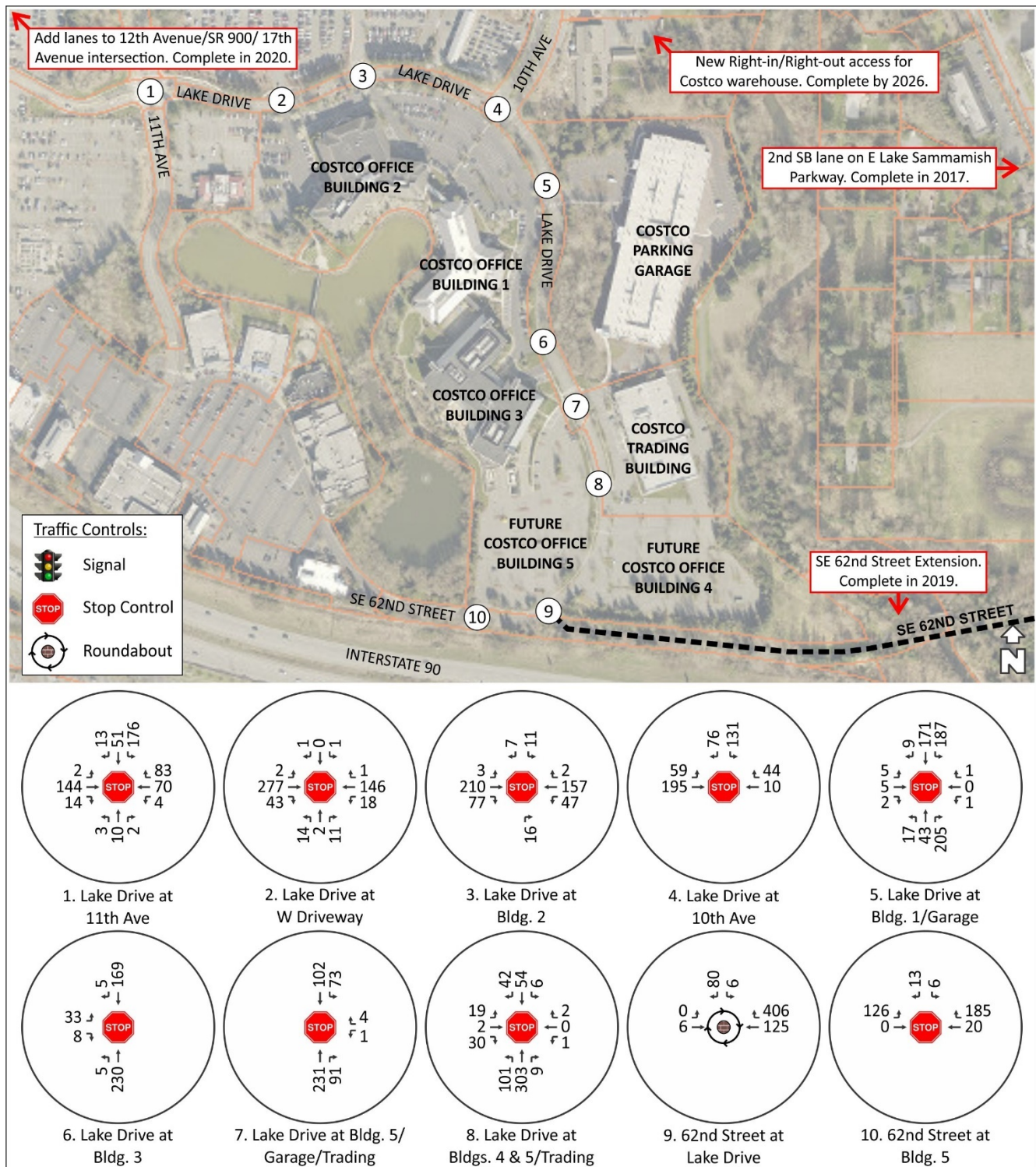


Figure 8: 2026 Without-Development AM Peak Hour



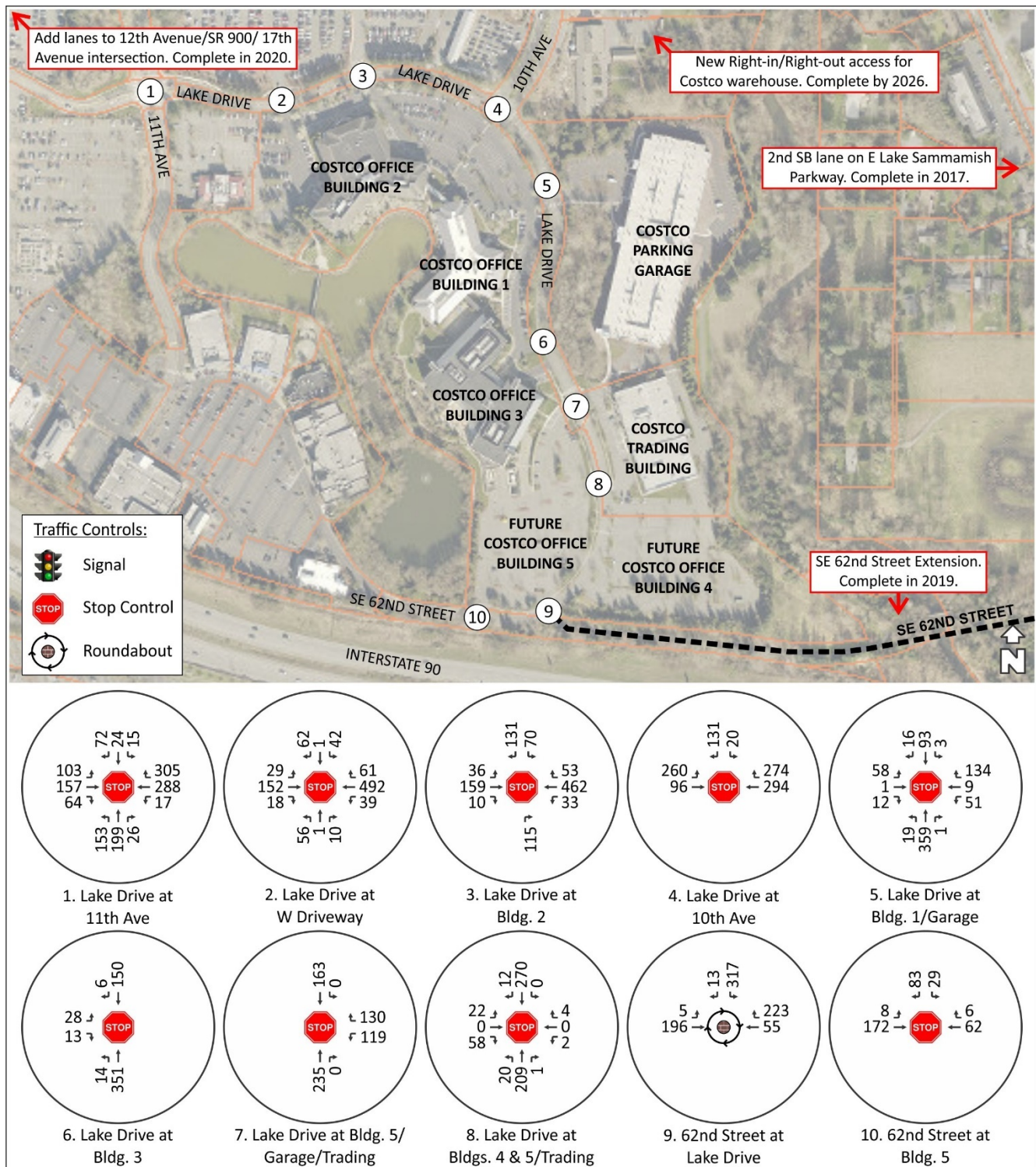


Figure 9: 2026 Without-Development PM Peak Hour

#### v. Future Without-Development Intersection Performance

Intersection performance calculations were computed for year 2026 traffic conditions without the proposed development and are summarized in Table 4.

The planned roundabout at 62nd Street and Lake Drive was evaluated using the SIDRA, version 7, computer program. Intersection capacity reports are included in the Appendix. Synchro, version 9 was used to evaluate the other intersections.

**Table 4: Future Without-Development Level of Service**

Intersection	Control	AM Peak Hour			PM Peak Hour		
		LOS	Delay <sup>1</sup>	V/C <sup>2</sup>	LOS	Delay <sup>1</sup>	V/C <sup>2</sup>
1. Lake Dr. at 11th Ave	All Stop	B	10.1	0.36	C	18.5	0.66
2. Lake Dr. at West Drwy.	N/S Stop	B	12.2	0.06	D	27.1	0.31
3. Lake Dr. at Bldg. 2 Drwy.	N/S Stop	B	11.9	0.04	C	18.5	0.31
4. Lake Dr. at 10th Ave	All Stop	A	9.4	0.30	B	12.3	0.49
5. Lake Dr. at Bldg. 1/Garage Drwy.	E/W Stop	C	18.3	0.16	C	18.5	0.37
6. Lake Dr. at Bldg. 3 Drwy.	E/W Stop	B	11.4	0.07	B	12.0	0.08
7. Lake Dr. at Garage/Trading Drwy.	E/W Stop	B	10.5	0.07	B	11.7	0.22
8. Lake Dr. at Bldgs. 4 & 5/Trading Drwy.	E/W Stop	B	11.9	0.07	B	12.1	0.09
9. Lake Dr. at SE 62nd Street	RAB	A	4.8	0.40	A	9.8	0.26
10. SE 62nd Street at Bldg. 5 Drwy.	SB Stop	A	9.8	0.10	A	9.3	0.04

<sup>1</sup> Delay is expressed in seconds of control delay

<sup>2</sup> V/C ratio of worst movement

With the planned North Issaquah Road Improvements (section 4.i), some intersections were calculated with improved intersection LOS and delay as compared to existing traffic conditions. These improvements are due to traffic redistribution within Pickering Place.

Future without-development conditions include a new roundabout intersection at Lake Drive and 62nd Street, and the roundabout is computed to operate well at LOS “A” in both the AM and PM peak hours

In the AM peak hour, Lake Drive at 10th Ave and Lake Drive at the Building 1/Garage driveways, are forecast to improve from LOS “E” and “F”, with existing conditions, to LOS “A” and “C”, in the future without Buildings 4 and 5. This improvement is due to the planned SE 62nd Street extension over Issaquah Creek which is projected to divert a significant amount of traffic to/from the Costco home office campus away from the Lake Drive and 10th Ave intersection and the adjacent Building 1/Garage driveways off Lake Drive.

All study intersections operate at LOS “D” or better and satisfy the City’s intersection LOS standard.

Review of the individual intersection turning movements shows that the intersections operate with V/C ratios within the City of Issaquah standards.

## 5. Trip Generation and Distribution

This section documents the trip generation forecast and weekday PM peak hour trip distribution and travel assignment of new traffic generated by the proposed development of Buildings 4 and 5.

### i. Trip Generation – Buildings 4 and 5

Buildings 4 and 5 will replace roughly 500 existing surface parking spaces, south of Building 3 and the Trading Building, with 2,000 new parking spaces (200 spaces with Building 4 and 1,800 spaces with Building 5). Overall the on-campus parking will support the needs of the existing and proposed campus.

Currently there are 2,800 home office campus employees. At full capacity the existing campus can accommodate 3,300 employees. With buildings 4 and 5 Costco Home office will have capacity for up to 4,320 new employees, an increase of 30%.

Using the campus' trip rates derived from data presented Section 3.iii, Buildings 4 and 5 are forecast to generate 1,771 AM peak hour trips (1,594 in and 177 out) and 1,512 PM peak hour trips (177 in and 1,270 out). Table 5 summarizes the trip generation forecast.

**Table 5: Buildings 4 and 5 PM Peak Hour Trip Generation Forecast**

Time-Period	Existing Campus <sup>1</sup>		Remaining Office Space <sup>2</sup>		Occupy Buildings 4 & 5 <sup>3</sup>	
Total Employees	2,800		500		4,320	
Peak Hour	AM	PM	AM	PM	AM	PM
Trip Rate	0.41	0.35	0.41	0.35	0.41	0.35
Total Trip	1,138	981	205	175	1,771	1,512
Trips-In	1,028	157	185	28	1,594	242
Trips-Out	110	824	20	147	177	1,270

<sup>1</sup> Based on year 2017 tube-data (report Section 3.iii)

<sup>2</sup> Without-Development trips generated with occupancy of the remaining corporate office space of the existing campus (report Section 4.iii)

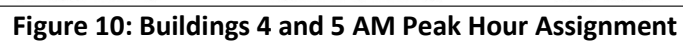
<sup>3</sup> Trips based on proposed number of new employees

The trip generation forecast above is conservative and represents a worst-case condition. The future trip generation input assumes there are no changes in employees' travel modes or average vehicle occupancy and build-out and occupancy of all available home office employee space. In the long-term, travel mode shifts will likely occur that have the potential to reduce the home office trips by up to 20%. These mode shifts are due to increases in transit service, ride-share programs, and with extension of Sound Transit Link light rail. Regional congestion constraints (I-90, I-405, and East Lake Sammamish Pkwy) will also cause spreading of the peak period, reducing trip generation in the single peak hour volumes for all employment centers in the region. These travel mode shifts are reflected in the Citywide Travel Demand Model.

### ii. PM Peak Hour Trip Assignment – Buildings 4 and 5

The Citywide Travel Demand Model was used to guide the distribution of new trips through the study area with adjustments made for the locations of proposed private driveways and private internal roadway connections between buildings and parking on the home office campus. Figures 10 and 11 illustrate the forecasted AM and PM peak hour trip distributions and traffic assignments.





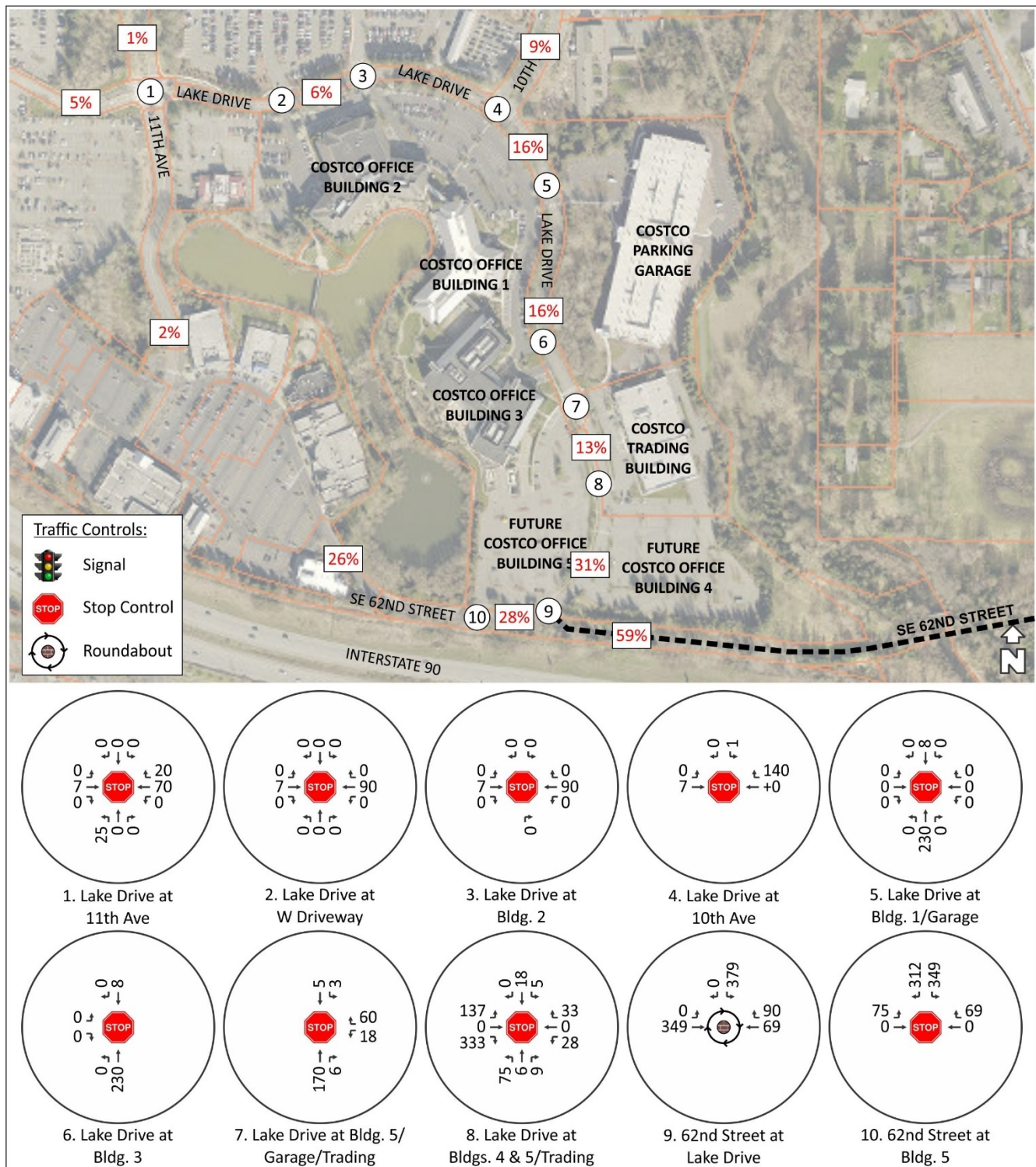


Figure 11: Buildings 4 and 5 PM Peak Hour Assignment



## 6. Future Conditions with Buildings 4 and 5

This section documents future traffic conditions with build-out of Buildings 4 and 5.

The future with-development traffic forecasts assume full occupancy of the remaining employee space at the existing home office campus and full occupancy of the employee space designated for Buildings 4 and 5. The future trip generation forecasts, as stated above, do not address future changes in employee travel modes to and from the home office campus; and thus, the conclusions drawn from this analysis of with-development conditions is conservative.

### i. Future With-Development Access Configuration

**Building 4** will consolidate existing accesses on the east side of Lake Drive into a shared access just south of south of Costco Trading Building. The shared driveway will serve as the east leg to a new driveway aligned with access to Building 5. The Building 4 site also proposes a loading area off SE 62nd Street.

**Building 5** will consolidate existing accesses on the west side of Lake Drive into a new access aligned with the new shared access of Building 4 and Costco Trading Building. A second access to Building 5 will be provided on SE 62nd Street to the west of the roundabout at Lake Drive and SE 62nd Street. With Building 5, the existing north driveway of Lot 5, located south of Costco Office Building 3, will be vacated.

### ii. Future With-Development Traffic Volumes

With-development peak hour traffic volumes were forecast by superimposing the forecasted new trips (Figures 10 and 11) onto the traffic volume conditions without Buildings 4 and 5 (Figures 8 and 9). The future with-development PM peak hour traffic volumes are illustrated in Figures 12 and 13.

Future Building 5 outbound driveways off Lake Drive and SE 62nd Street are assumed to include separate left and right turn lanes. This design recommendation will be incorporated in to future site plans.

### iii. Future With-Development Intersection Performance

Intersection performance calculations were computed for future traffic conditions with the proposed development and are summarized in Table 5.

**Table 5: Future With-Development Level of Service**

Intersection	Control	AM Peak Hour			PM Peak Hour		
		LOS	Delay <sup>1</sup>	V/C <sup>2</sup>	LOS	Delay <sup>1</sup>	V/C <sup>2</sup>
1. Lake Dr. at 11th Ave	All Stop	C	24.8	0.78	C	24.4	0.83
2. Lake Dr. at West Drwy.	N/S Stop	C	19.8	0.11	D	33.7	0.37
3. Lake Dr. at Bldg. 2 Drwy.	N/S Stop	C	17.7	0.06	C	21.7	0.37
4. Lake Dr. at 10th Ave	All Stop	F	86.3	1.19	C	15.3	0.65
5. Lake Dr. at Bldg. 1/Garage Drwy.	E/W Stop	F	69.0	0.24	D	32.0	0.53
6. Lake Dr. at Bldg. 3 Drwy.	E/W Stop	C	23.0	0.18	B	14.7	0.11
7. Lake Dr. at Garage/Trading Drwy.	E/W Stop	C	19.9	0.37	C	15.1	0.33
8. Lake Dr. at Bldgs. 4 & 5/Trading Drwy.	E/W Stop	B	14.6	0.20	E	40.1	0.64
9. Lake Dr. at SE 62nd Street	RAB	B	10.4	0.86	B	16.4	0.75
10. SE 62nd Street at Bldg. 5 Drwy.	SB Stop	B	14.1	0.41	C	23.0	0.80

<sup>1</sup> Delay is expressed in seconds of control delay

<sup>2</sup> V/C ratio of worst movement

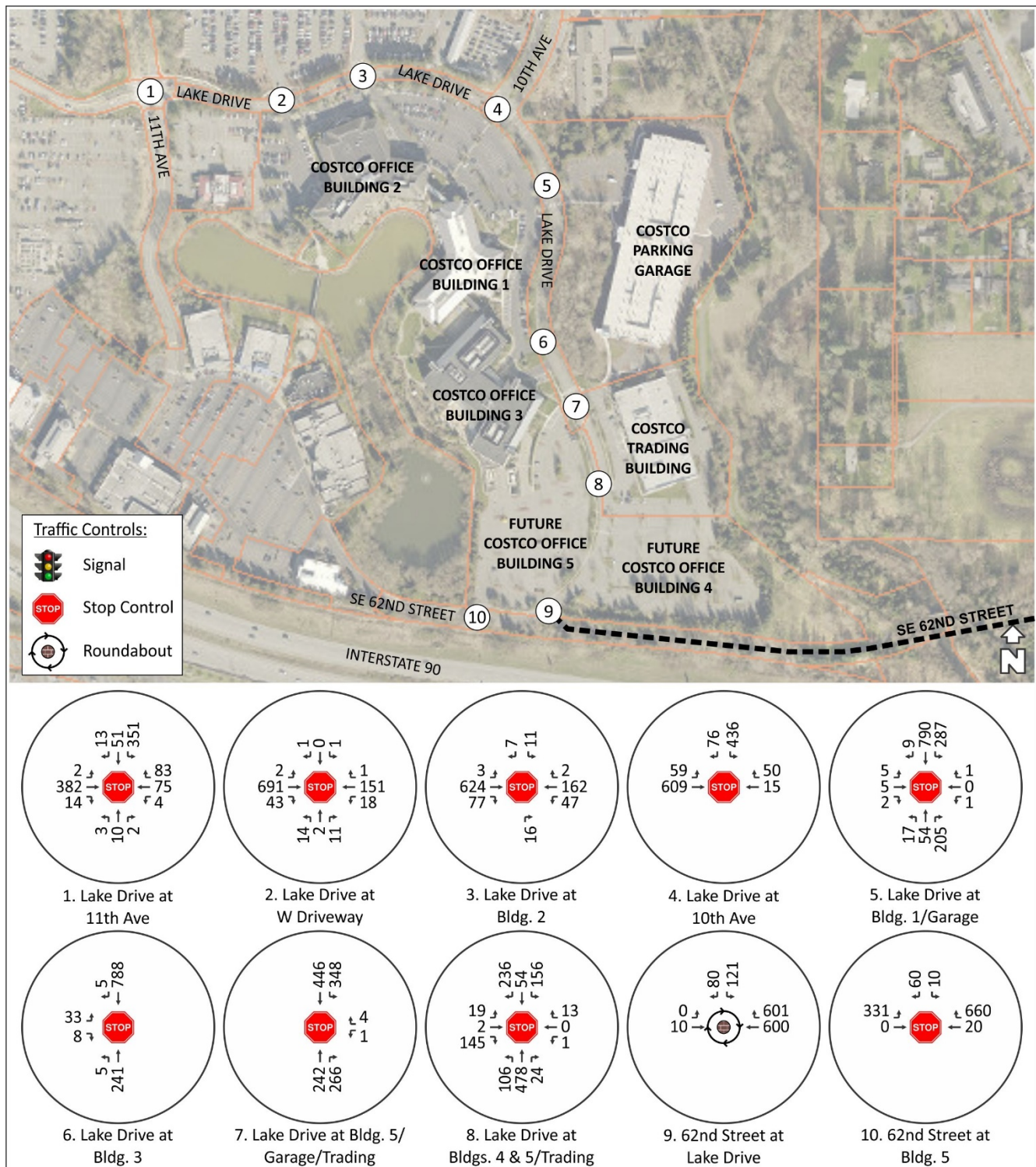


Figure 12: 2026 With-Development AM Peak Hour Volumes



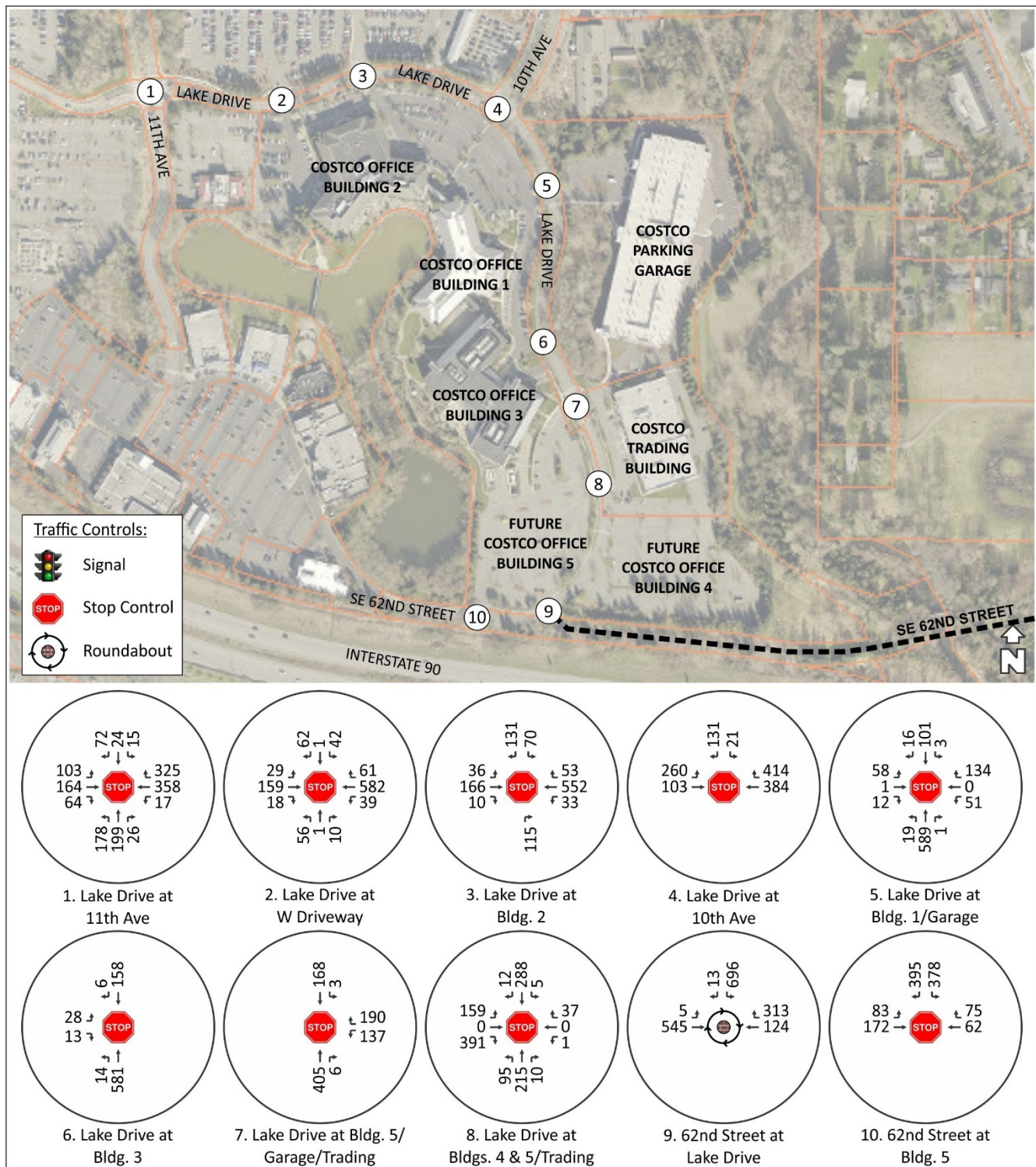


Figure 13: 2026 With-Development PM Peak Hour Volumes



The following outlines the with-development study intersection operations:

1. Lake Drive at 11th Ave is all-way stop sign controlled. The intersection operates overall at LOS “C” in the AM and PM peak hours. In the PM peak hour, the westbound shared left-through lane operates at LOS “E” and has a V/C ratio of 0.83, that supports the City of Issaquah requirements. No mitigation for level of service or V/C is warranted.
2. Lake Drive at West Driveway/Warehouse. Both driveways are stop sign controlled. During the AM and PM peak hour, the driveway approaches operate at LOS “D” or better and the eastbound and westbound left turn movements from Lake Drive operate at LOS “A”. Individual turning movements operate with V/C ratios that are within the City of Issaquah standards. No mitigation for level of service or V/C is warranted.
3. Lake Drive at Building 2 Driveway/Warehouse. Both driveways are stop sign controlled. During the AM and PM peak hour, the driveway approaches operate at LOS “D” or better and the eastbound and westbound left turn movements from Lake Drive operate at LOS “A”. Individual turning movements operate with V/C ratios that are within the City of Issaquah standards. No mitigation for level of service or V/C is warranted.
4. Lake Drive at 10th Ave all-way stop sign controlled. The intersection operates overall at LOS “F”, in the AM peak hour, and LOS “C” and PM peak hour. In the AM peak hour, the eastbound through lane operates at LOS “F” and has a V/C ratio of 1.19 and the southbound left turn lane operates at LOS “F”. The Development Agreement states that this intersection would be improved with either a signal or acceptable alternative with the City of Issaquah providing right-of-way and Costco completing the improvement. The with-development AM peak hour intersection LOS and V/C ratio shows that an improvement is warranted. The timing of an improvement should be determined at occupancy of 550,000 square feet of building area, per the Development Agreement, or should be based on actual traffic volumes collected as part of post-construction traffic studies as described in later in this report.
5. Lake Drive at Building 1/N Garage Driveway. Both driveways are stop sign controlled.
  - In the AM peak hour, the eastbound private driveway approach operates at LOS “F”, is forecast to serve 12 vehicles (5 lefts, 5 throughs and 2 rights), and has a V/C ratio of 0.19. The westbound private driveway approach operates at LOS “F”, serves 2 vehicles (1 left and 1 right), and has a V/C ratio of 0.02. The driveway volumes are small, and the relationship between the volume exiting the driveways and the computed delays is not considered to be significant. Further, the V/C ratios of the driveway approaches and of the left turns maneuvers from Lake Drive to the driveways do not suggest any major traffic operations deficiencies that would noticeably impact through volumes on the Lake Drive.
  - In the PM peak hour, the eastbound private driveway approach operates at LOS “D” and the westbound private driveway approach operates at LOS “B” and V/C ratio of the stopped controlled and left turn movements satisfy the City of Issaquah thresholds.
  - Since the delays, volumes, and character of the traffic will not adversely impact Lake Drive, no mitigation for level of service or V/C ratio is recommended.
6. Lake Drive at Building 3 Driveway. The driveway is stop-sign controlled. The eastbound driveway approach operates at LOS “C”, in the AM peak hour, and LOS “B”, in the PM peak hour. No mitigation for level of service or V/C ratio is warranted.

7. Lake Drive at Garage/Trading Building Driveway. The driveway is stop sign controlled. The westbound driveway approach operates at LOS “C” in the AM and PM peak hours. In the AM peak hour, the westbound left turn movement operates at LOS “F” with 57.2 seconds of delay and a V/C ratio 0.02. There is only 1 vehicle forecast to make a westbound left in the AM peak hour. No mitigation is warranted to offset the AM peak hour LOS and delay impacts. The V/C ratios of the stopped controlled and left turn movements satisfy the City of Issaquah thresholds.
8. Lake Drive at Buildings 4 and 5/Trading Building Driveways. Both driveways are stop-sign controlled.
  - In the AM peak hour, the eastbound driveway approach operates at LOS “B”. The eastbound approach includes two outbound lanes and the left turn movement is forecast to operate at LOS “E”, with 45 seconds of delay, and a V/C ratio of 0.19. There are 19 left turns forecast at the driveway, and with the low volume and V/C ratio no mitigation is warranted.
  - In the PM peak hour, the eastbound driveway approach operates at LOS “C”. The eastbound left turn movement is forecast to operate at LOS “E”, with 39 seconds of delay, and a V/C ratio of 0.64. There are 159 vehicles forecast making left turns at the driveway. The eastbound left turn V/C ratio satisfies the City of Issaquah’s requirements and no mitigation is warranted.
  - In the PM peak hour, the westbound driveway approach operates at LOS “E”, with 40 seconds of delay, and a V/C ratio of 0.42. There are 30 vehicles forecast making left turns and 37 vehicles forecast making right turns at the driveway. The westbound V/C ratio satisfies the City of Issaquah’s requirements and no mitigation is warranted.
  - The V/C ratios for the dedicated left turn movements from Lake Drive, support the City of Issaquah’s V/C ratio requirements.
9. Lake Drive at SE 62nd Street is a roundabout intersection. The roundabout operates at LOS B in both the AM and PM peak hours. The AM peak hour westbound V/C ratio is 0.86 and the PM peak hour eastbound V/C ratio is 0.75. The V/C ratios support the WSDOT guidelines for roundabout operations and no design modifications to the roundabout are proposed.
10. SE 62nd Street at Building 5 Driveway. The driveway is stop sign controlled. During the AM and PM peak hours, the southbound driveway approach operates at LOS “B” and “C”. The driveway is modeled with separate left and right turn outbound lanes, and both operate at LOS “D” or better in the peak hours. The V/C ratios of the stopped controlled and left turn movements satisfy the City of Issaquah thresholds and no mitigation is warranted.

#### iv. Future With-Development Circulation and Queuing Analysis

Vehicle queues were evaluated with the full occupancy with Buildings 4 and 5 using the SimTraffic compute program, which is compatible to Synchro. Both average and 95th-percentile queues were reported for key traffic movements and the detailed SimTraffic output is included in the Appendix.

- SimTraffic considers a vehicle in the queue, if it is traveling at less than 10 mph.
- Average queue (50-Q) represents the queue that would be observed under typical conditions. SimTraffic defines the queue as the average of all the 2-minute maximum queues.
- 95th-percentile queue (95-Q) is a statistical computation of queue conditions based on 95th percentile volumes. Per SimTraffic, this queue distance may not necessary be ever observed.

Table 6 summarizes the with-development vehicle queues and relevant storage lane lengths. In the table, the highlighted values exceed the available storage lengths.

Table 6: 2026 With-Development Vehicle Queue Summary

Intersection (Control)	Mvmt/ Avg.	AM Peak Hour		PM Peak Hour		Available Storage (ft)
		50-Q (ft)	95-Q (ft)	50-Q (ft)	95-Q (ft)	
1. Lake Dr. at 11th Ave (All Stop)	WB LT	33	57	98	198	290
	WB R	30	47	77	132	110
2. Lake Dr. at West Drwy. (N/S Stop)	EB L	1	30	13	38	160
	EB TR	153	389	0	0	290
	WB L	8	32	7	27	70
	WB TR	0	0	2	27	175
	NB	30	78	36	63	
	SB	2	13	45	83	
3. Lake Dr. at Bldg. 2 Drwy. (N/S Stop)	EB L	4	37	14	36	70
	EB TR	130	270	2	11	175
	WB L	15	41	5	23	50
	WB TR	2	16	6	31	170
	NB	26	72	41	68	
	SB	21	64	45	78	
4. Lake at 10th Ave (All Stop)	EB L	76	142	47	73	50
	EB T	287	420	33	67	280
	WB T	12	37	64	106	200
	WB R	27	49	70	105	50
	SB L	129	226	14	37	250
	SB R	39	123	33	56	250
5. Lake Dr. at Bldg. 1/Garage Drwy. (E/W Stop)	EB	10	33	35	67	
	WB	2	13	70	112	
	NB L	8	30	3	16	50
	NB TR	3	15	0	0	350
	SB L	37	63	1	9	75
	SB TR	0	0	2	36	200
6. Lake Dr. at Bldg. 3 (EB Stop)	EB	29	59	24	52	
	NB L	4	20	3	17	50
	NB T	0	0	0	0	90
	SB	4	44	8	94	350
7. Lake Dr. at Bldg. 5/Garage/ Trading Drwy. (E/W Stop)	WB	3	16	47	85	
	NB	16	40	0	4	200
	SB L	56	77	1	9	50
	SB TR	20	92	3	35	90
8. Lake Dr. at Bldgs. 4 & 5/ Trading Drwy. (E/W Stop)	EB	40	67	89	128	
	WB	10	32	32	61	
	NB L	23	52	22	51	50
	NB TR	1	10	0	0	250
	SB L	33	61	1	11	50
	SB TR	4	22	6	53	200
9. Lake Dr at SE 62nd Street (RAB) <sup>1</sup>	EB		1		254	260
	WB		523		64	2,000
	SB		30		113	250
10. SE 62nd Street at Bldg. 5 Drwy. (SB Stop)	EB	125	223	27	94	300
	WB	39	74	7	58	260
	SB	28	49	100	140	

<sup>1</sup> For roundabout analyses, queues are only reported as 95th-percentile queues

In the AM peak hour:

- The 95th-percentile queues exiting driveways are 3 car lengths or less, which does not suggest that there would be any adverse circulation impacts on the campus.
- The 95th-percentile eastbound queue on Lake Drive extends from 10th Ave through 11th Ave, due to the LOS F operations at Lake Drive and 10th Ave. An improvement to Lake Drive and 10th Ave to improve traffic flow eastbound will mitigate queue impacts on between 10th Ave and 11th Ave.
- At the Lake Drive and 62nd Street roundabout, the vehicle queues do not extend to adjacent driveways. And while the westbound approach queue may extend over 500 feet, the morning V/C is LOS and delay are acceptable.
- The southbound 95th-percentile queues on Lake Drive at the Garage/Trading Building driveway are 77 feet for the left turn movement and 92 feet for the shared through-right turn movement. There is about 90 feet separating the Garage/Trading Building driveway and the Building 3 driveway to the north. If this actually becomes a regularly recurring issue, morning traffic will shift to the other driveway (N Garage Driveway opposite Building 1, Building 5/Trading Buildings driveway) to access the site. It is reasonable to expect that the southbound queue can mitigate itself with minor traffic redistribution through the system as drivers shift to find the path of least resistance. For left turn pocket striping recommendations see Section 8.ii.
- The 95th-percentile northbound left turn queue on Lake Drive at the Buildings 4 and 5/Trading Building driveway is calculated to extend to 52 feet (50 feet available). For left turn pocket striping recommendations see Section 8.ii. There is 250 feet between this driveway and the roundabout at 62nd Street, and queue spillback is not anticipated.
- The 95th-percentile southbound left turn queue on Lake Drive at the Buildings 4 and 5/Trading Building driveway is calculated to extend to 61 feet (50 feet available). For left turn pocket striping recommendations see Section 8.ii. There is more than 190 feet between this driveway and Garage/Trading Building driveway to the north, and queue spillback is not anticipated.

In the PM peak hour:

- The 95th-percentile queues exiting driveways are 5 car lengths or less, on Lake Drive, and up to 6 cars, on 62nd Street. The exiting queues are not unreasonable for the peak hour and do not suggest that there would be any adverse onsite circulation impacts.
- At the Lake Drive and 62nd Street, the 95th-percentile eastbound vehicle queue is not calculated to extend to the Building 5 driveway off 62nd Street. The queue does get close to the driveway; however, the roundabout operations do not suggest any major concerns with LOS, V/C and queue.
- The 95th percentile westbound right turn queue on Lake Drive approaching 11th Ave exceeds the storage pocket length by 32 feet. Overall the westbound approach queues do not impede access to the adjacent driveways west of the intersection. Expanding the right turn pocket to support the right turn queue is not required to offset any intersection blocking impacts.
- At Lake Drive and 10th Ave, the 95th percentile eastbound left turn queue exceeds the storage pocket length by 23 feet and the westbound right turn queue exceeds the storage pocket length by 55 feet. Overall the eastbound and westbound approach queues do not impede access to the adjacent driveways. AM peak hour traffic operations impacts at Lake Drive and 11th Ave indicate that an intersection improvement is needed.

- The 95th-percentile northbound left turn queue on Lake Drive at the Buildings 4 and 5/Trading Building driveway is calculated to extend to 51 feet (50 feet available). For left turn pocket striping recommendations see Section 8.ii. There is 250 feet between this driveway and the roundabout at 62nd Street, and queue spillback is not anticipated.

As stated above, the 95th-percentile queue is a statistical calculation based on calculated 95th-percentile traffic volumes. If these volumes do occur, they represent a total of 3 minutes of the given peak hour.

#### **v. Future With-Development Traffic Operations Summary**

1. Lake Drive at 11th Ave. The intersection LOS and V/C ratios of the individual movements support the City of Issaquah requirements. The westbound right turn queue exceeds the right turn pocket length; however, the queue overall does not extend to the adjacent warehouse/west Costco home office driveway. The peak hour queue impact is not significant, and no mitigation is warranted.
2. Lake Drive at West Driveway/Warehouse. The driveways operate sufficiently. Eastbound queues extend from 10th Ave through this driveway. Mitigation to improve Lake Drive and 10th Ave is recommended to reduce queue impacts on Lake Drive.
3. Lake Drive at Building 2 Driveway/Warehouse. The driveways operate sufficiently. Eastbound queues extend from 10th Ave through this driveway. Mitigation to improve Lake Drive and 10th Ave is recommended to reduce queue impacts on Lake Drive.
4. Lake Drive at 10th Ave. AM peak hour LOS does not support the City of Issaquah requirements and the operations result in eastbound queues extending to 11th Ave. The Development Agreement states that this intersection would be improved with either a signal or equivalent form of traffic control, with the City of Issaquah providing right-of-way and Costco completing the improvement.
5. Lake Drive at Building 1/N Garage Driveway. Lake Drive operations well at this location. The driveways, in the AM peak hour operate with noticeable delays; however, the exiting driveway volumes do not justify an improvement and mitigation is not warranted.
6. Lake Drive at Building 3 Driveway. Traffic operations are reasonable, and no mitigation is warranted.
7. Lake Drive at Garage/Trading Building Driveway. In the AM peak hour, the left turn movement out of the driveway operates at LOS "F"; however, the delay only affects one left turning vehicle. The southbound queue (92 feet) extend to the adjacent driveway at Building 3 (90 feet away). Traffic mitigation is not warranted. The LOS only affects one vehicle and the vehicle volumes can redistribute to adjacent driveways to mitigate the queues.
8. Lake Drive at Buildings 4 and 5/Trading Building Driveways. The driveways operate reasonably well, and LOS E. V/C ratios are acceptable, and queues are not significant. No mitigation is warranted.
9. Lake Drive at 62nd Street. The roundabout LOS and V/C ratios of the individual approaches support the City of Issaquah requirements. No design modifications to the roundabout are proposed.
10. 62nd Street at Building 5 Driveway. Traffic operations are reasonable, and no mitigation is warranted.

## 7. Non-Motorized Section

Non-motorized travel modes will be supported by a continuous network of bicycle and pedestrian facilities including on-street facilities on Lake Drive associated with the City of Issaquah's SE 62nd Street extension project and the Pickering Trail that parallels Issaquah Creek to the east of Lake Drive. Non-motorized circulation onsite includes linkages to the public facilities in the right-of-way. Sidewalk gaps not filled in by the SE 62nd Street extension project will be included with Costco's frontage responsibilities. Pedestrian demand across Lake Drive associated with the new buildings and parking structures is currently accommodated at at-grade marked cross-walks. The at-grade crosswalks will be supplemented by a covered sky-bridge between Buildings 4 and 5. Existing at-grade crossings utilize rectangular rapid flashing beacons (RRFB's) to improve pedestrian safety and new at-grade crossings will also utilize them.

Non-motorized access to the buildings is provided via walkways and plazas connecting to the adjacent sidewalks. Access to and from the Pickering Trail will be provided via onsite sidewalks and plazas. Use of drive aisles for non-motorized access will be discouraged.

Pedestrian and bicycle safety is most impacted by the speed of adjacent and conflicting vehicles. Design features including roundabouts, horizontal curve, street trees, dedicated bicycle lanes, and narrow travel lanes all reduce adjacent vehicle travel speed and are included in the development.

## 8. Mitigation Recommendations

### i. Intersection Mitigation Analysis and Recommendations

In the AM peak hour, the Lake Drive and 10th Ave intersection is forecast to operate at LOS F with development of Buildings 4 and 5. The poor intersection operations result in AM peak hour queues spilling through the local driveways between 11th Ave and 10th Ave.

Consistent with the Development Agreement Costco will be responsible for improving this intersection with a signal or other equivalent traffic control measure and the City of Issaquah will assist in obtaining any necessary right-of-way.

Table 7 compares the traffic operations with at Lake Drive and 10th Ave with the development as an all-way stop (current configuration), as a signal and as a single-lane roundabout.

**Table 7: Lake Drive/10th Ave Mitigation Options With-Development Performance**

Avg./ Mvmt.	No Change (All-Way Stop)				Signal				Roundabout <sup>1</sup>			
	LOS	Delay <sup>1</sup>	V/C <sup>2</sup>	95-Q <sup>3</sup>	LOS	Delay <sup>1</sup>	V/C <sup>2</sup>	95-Q <sup>3</sup>	LOS	Delay <sup>1</sup>	V/C <sup>2</sup>	95-Q <sup>3</sup>
<b>AM Peak Hour</b>												
Avg.	F	86.3	1.19		B	11.2	0.79		A	8.9	0.66	
EB L	B	10.9	0.13	142	A	7.1	0.09	78	A	9.3	0.66	167
EB T	F	134.9	1.19	420	A	10.0	0.76	211				
WB T	B	10.9	0.04	37	A	9.7	0.03	30	A	4.0	0.05	7
WB R	B	10.7	0.11	49	B	10.1	0.11	45				
SB L	F	53.2	0.98	226	B	14.0	0.79	207	A	8.9	0.38	59
SB R	A	10.0	0.15	123	A	9.2	0.15	64				
<b>PM Peak Hour</b>												
Avg.	C	15.3	0.65		A	9.5	0.70		A	7.2	0.71	
EB L	C	16.1	0.51	73	A	6.1	0.48	86	A	8.1	0.27	42
EB T	B	10.2	0.19	67	A	2.6	0.09	51				
WB T	C	18.1	0.65	106	A	9.3	0.55	189	A	7.0	0.71	185
WB R	B	15.0	0.61	105	B	10.8	0.70	117				
SB L	B	10.8	0.05	37	B	13.9	0.09	36	A	6.3	0.16	22
SB R	B	11.5	0.26	56	B	17.3	0.60	63				

<sup>1</sup> Delay is expressed in seconds of control delay

<sup>2</sup> V/C ratio of worst movement

<sup>3</sup> 95th-percentile queue; measured in feet

A signal or roundabout will improve traffic flow on Lake Drive. In the AM peak hour, either intersection improvement will significantly reduce the eastbound queues on Lake Drive to mitigate the spillover projected with Lake Drive and 10th Ave operating at LOS F with all-way stop sign control.

As a signal, the eastbound left turn pocket would need to be extended to at least 90 feet to support the left turn queues in both the AM and PM peak hour. Also, a westbound right turn pocket would need to be at least 120 feet to support PM peak hour queue.

As a roundabout, the intersection queues do not extend between adjacent intersections. The roundabout will operate more efficiently than a signal. The costs associated with either a roundabout or a signal should be weighted against right-of-way needs and other utility impacts. A signal will have less right-of-way and potentially fewer utility implications.



The timing of this intersection improvement is triggered by occupancy of 550,000 square feet of the building space. Further, the need for improvement as discussed in this report is based on assumptions and factors that may or may not materialize, including:

- No increase in the non-auto mode split.
- No increase in average vehicle occupancy.
- No change in the annual percent background traffic growth.
- No restriction in traffic growth due to peak period spread due to regional capacity constraints.
- Traffic volume diversion associated with the SE 62nd Street road improvements occur as forecasted.
- Full realization of the redevelopment assumed for Pickering Place uses (see Table 3).

As such, a post-occupancy study should be performed to ensure that the improvement is made prior to a level of service or V/C deficiency, as defined by the City of Issaquah. It is recommended that a traffic counts at the intersection of 10th Ave and Lake Drive be made one year after initial occupancy of either building and every two years thereafter until the improvement is determined warranted. Each two-year study should project two years into the future to account for the time necessary to design and construct improvements. The newly forecasted volumes will be analyzed to determine if traffic improvements are warranted using City of Issaquah level of service and V/C ratio criteria as a trigger.

## **ii. Driveway Recommendations – Recommendations for Turn Lanes on Lake Drive**

Sight distance exhibits are provided with the June 7, 2018 Costco Home Office Buildings 4 and 5 Intersection Sight Distance Deviation from Standard letter in the Appendix.

The future site access locations meet stopping sight distance requirements.

The intersection sight distance requirements are supported in both directions of SE 62nd Street at the south driveway of Building 5, in both of Lake Drive at the north driveway of Building 4, and on Lake Drive to the south of the north driveway of Building 5. Intersection sight distance on Lake Drive to the north of the north driveway of Building 5 falls 40 feet short of the sightline requirement.

The location of the north driveway of Building 5 is reasonable because:

- The Building 5 façade meets the City of Issaquah’s Urban Design Standards which require a 10-foot setback from the property line.
- The north Building 5 driveway exceeds the stopping sight distance requirements, so an approaching vehicle has sufficient sight distance to anticipate and avoid a collision at the driveway.
- The north Building 5 location, which is across from the north driveway of Building 4 is preferred to reduce the potential for left turning conflicts to and from Lake Drive.
- The north Building 5 location supports the 200 feet spacing requirement from the roundabout intersection at Lake Drive and SE 62nd Street.
- The queue analysis, presented in Section 6.iv, does not indicate any significant or adverse vehicle queue impacts with the driveway located as shown in the site plan.

With an improvement at Lake Drive and 10th Ave, vehicle queues with full development are not forecasted to adversely impact the Costco home office driveways and there are no instances where queues are projected to spillback between intersections and driveways on public or private streets.



Existing left turn pockets at the driveways on the east-west section of Lake Drive between 11th Ave and 10th Ave are reasonable.

Left turn pocket recommendations for the north-south section of Lake Drive between 10th Ave and SE 62nd Street are as follows:

- On Lake Drive between the Building 3 driveway and the Garage/Trading Building driveway a center two-way left turn lane is recommended to support lefts turns into the driveways.
- The northbound left turn storage on Lake Drive at the Buildings 4 and 5/Trading Building driveway is recommended to be at least 60 feet to support AM peak hour 95th-percentile queues. There is about 250 feet separating the driveway and roundabout at SE 62nd Street to the south.
- The southbound left turn storage on Lake Drive at the Buildings 4 and 5/Trading Building driveway is recommended to be at least 75 feet to support AM peak hour 95th-percentile queues. There is about 190 feet separating the driveway and the Garage/Trading Building driveway to the north.
- Other left turn storage pockets are sufficient if striped with at least 50 feet of storage.

## 9. Relationship to the Development Agreement

The Development Agreement permits Costco to build-out up to 1.5 million square feet of office space, 250,000 square feet of which can be used for commercial space.

As stated above, Buildings 4 and 5 represent the first phase of new development. New building areas are within the total gross floor areas and uses allowed under the Development Agreement.

Both buildings will increase Costco parking to support new development.

The following compares the Development Agreement requirements with this Traffic Analysis' major findings:

Development Agreement Requirement	Information Provided in Traffic Analysis
A. Install a traffic signal or other form of traffic control at 10 <sup>th</sup> Avenue at Lake Drive prior to occupancy of 550,000 square feet of future development	This study recommends installation of traffic control improvements at 10 <sup>th</sup> Avenue at Lake Drive. The timing of such an improvement should be determined by a post-occupancy study that forecasts volumes two years in advance of the study date to ensure the improvement is in place prior to actual needs. The post-occupancy study should be conducted at this intersection within one year following initial occupancy of either building and at intervals every two years thereafter using updated traffic counts. Regardless the findings of a post-occupancy study, improvements will be made prior to occupancy of 550,000 square feet, unless Costco elects to construct an improvement sooner.
B. Lake Drive Frontage Improvements on the south side of lake Drive west of the 10 <sup>th</sup> Avenue at lake Drive Intersection	This improvement is triggered by building 6 which is not part of this development phase.
C. Pedestrian Connection, west side of 10 <sup>th</sup> Avenue	This improvement is triggered by aspects of potential development other than Buildings 4 and 5 which is not part of this development phase.
D. Garage and Carwash Expansion	This is not applicable to this development phase.
E. Prepare a Traffic Analysis with each building permit	This traffic analysis provides the analysis of driveway and street operations.

## Appendix

### Traffic Counts

TRAFFIC COUNT CONSULTANTS, INC.  
Team@tc2inc.com  
(253) 770-1407

ISSAQUAH, WASHINGTON  
LAKE DR W/O  
COSTCO HQ S DRIVEWAY  
LOC# 04 V TSH17077TM

Site Code: 04

Date Start: 12-Jul-17  
Date End: 12-Jul-17

Start Time	10-Jul-17		Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB
12:00 AM	*	*	*	*	0	0	*	*	*	*	*	*	*	*	0	0
01:00	*	*	*	*	0	0	*	*	*	*	*	*	*	*	0	0
02:00	*	*	*	*	2	1	*	*	*	*	*	*	*	*	2	1
03:00	*	*	*	*	0	1	*	*	*	*	*	*	*	*	0	1
04:00	*	*	*	*	0	1	*	*	*	*	*	*	*	*	0	1
05:00	*	*	*	*	1	12	*	*	*	*	*	*	*	*	1	12
06:00	*	*	*	*	2	47	*	*	*	*	*	*	*	*	2	47
07:00	*	*	*	*	11	61	*	*	*	*	*	*	*	*	11	61
08:00	*	*	*	*	0	17	*	*	*	*	*	*	*	*	0	17
09:00	*	*	*	*	5	7	*	*	*	*	*	*	*	*	5	7
10:00	*	*	*	*	8	5	*	*	*	*	*	*	*	*	8	5
11:00	*	*	*	*	10	7	*	*	*	*	*	*	*	*	10	7
12:00 PM	*	*	*	*	12	20	*	*	*	*	*	*	*	*	12	20
01:00	*	*	*	*	13	12	*	*	*	*	*	*	*	*	13	12
02:00	*	*	*	*	17	13	*	*	*	*	*	*	*	*	17	13
03:00	*	*	*	*	44	14	*	*	*	*	*	*	*	*	44	14
04:00	*	*	*	*	50	5	*	*	*	*	*	*	*	*	50	5
05:00	*	*	*	*	60	7	*	*	*	*	*	*	*	*	60	7
06:00	*	*	*	*	7	2	*	*	*	*	*	*	*	*	7	2
07:00	*	*	*	*	3	3	*	*	*	*	*	*	*	*	3	3
08:00	*	*	*	*	0	0	*	*	*	*	*	*	*	*	0	0
09:00	*	*	*	*	0	1	*	*	*	*	*	*	*	*	0	1
10:00	*	*	*	*	1	1	*	*	*	*	*	*	*	*	1	1
11:00	*	*	*	*	1	1	*	*	*	*	*	*	*	*	1	1
Lane	0	0	0	0	247	241	0	0	0	0	0	0	0	0	247	241
Day	0		0		488		0		0		0		0		488	
AM Peak	-	-	-	-	07:00	07:00	-	-	-	-	-	-	-	-	07:00	07:00
Vol.	-	-	-	-	11	61	-	-	-	-	-	-	-	-	11	61
PM Peak	-	-	-	-	17:00	12:00	-	-	-	-	-	-	-	-	17:00	12:00
Vol.	-	-	-	-	60	20	-	-	-	-	-	-	-	-	60	20

Comb. Total	0	0	488	0	0	0	488
ADT	ADT 488	AADT 488					

ISSAQUAH, WASHINGTON  
LAKE DR S/O  
10TH AVE NW  
LOC# 03 V TSI17077TM

Site Code: 03

**Date Start: 12-Jul-17**  
**Date End: 12-Jul-17**

Start Time	10-Jul-17																Week Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB		
12:00 AM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	18		
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	1		
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	1		
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	1		
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	24	1		
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	185	8		
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	463	30		
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	765	52		
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	349	35		
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	147	58		
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	73	71		
12:00 PM	*	*	*	*	*	*	*	*	*	*	*	*	*	*	88	114		
	*	*	*	*	*	*	*	*	*	*	*	*	*	*	80	103		
01:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	107	124		
02:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	96	218		
03:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	71	340		
04:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	54	501		
05:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	49	487		
06:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	24	205		
07:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	25	71		
08:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	17	28		
09:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	6	11		
10:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	2	3		
11:00	*	*	*	*	*	*	*	*	*	*	*	*	*	*	10	4		
Lane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2640	2485		
Day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5125	5125		
AM Peak Vol.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	07:00	11:00		
PM Peak Vol.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	765	114		
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13:00	16:00		
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	107	501		

Comb.	0	0	0	0	0	0
Total	0	5125	0	0	0	5125



**Team@tc2inc.com**  
**(253) 770-1407**

**Date Start: 12-Jul-17**  
**Date End: 12-Jul-17**

Start Time	10-Jul-17				Tue				Wed				Thu				Fri				Sat				Sun				Week Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB				
12:00 AM	*	*	*	*	*	*	0	0	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	1				
01:00	*	*	*	*	*	*	0	0	0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0					
02:00	*	*	*	*	*	*	0	0	0	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0						
03:00	*	*	*	*	*	*	2	0	0	*	*	*	*	*	*	*	*	*	*	*	*	*	2	0						
04:00	*	*	*	*	*	*	3	0	0	*	*	*	*	*	*	*	*	*	*	*	*	*	3	0						
05:00	*	*	*	*	*	*	34	5	5	*	*	*	*	*	*	*	*	*	*	*	*	*	34	5						
06:00	*	*	*	*	*	*	95	10	10	*	*	*	*	*	*	*	*	*	*	*	*	*	95	10						
07:00	*	*	*	*	*	*	121	18	18	*	*	*	*	*	*	*	*	*	*	*	*	*	121	18						
08:00	*	*	*	*	*	*	48	11	11	*	*	*	*	*	*	*	*	*	*	*	*	*	48	11						
09:00	*	*	*	*	*	*	29	12	12	*	*	*	*	*	*	*	*	*	*	*	*	*	29	12						
10:00	*	*	*	*	*	*	16	9	9	*	*	*	*	*	*	*	*	*	*	*	*	*	16	9						
11:00	*	*	*	*	*	*	20	12	12	*	*	*	*	*	*	*	*	*	*	*	*	*	20	12						
12:00 PM	*	*	*	*	*	*	24	27	27	*	*	*	*	*	*	*	*	*	*	*	*	*	24	27						
01:00	*	*	*	*	*	*	24	28	28	*	*	*	*	*	*	*	*	*	*	*	*	*	24	28						
02:00	*	*	*	*	*	*	28	30	30	*	*	*	*	*	*	*	*	*	*	*	*	*	28	30						
03:00	*	*	*	*	*	*	36	37	37	*	*	*	*	*	*	*	*	*	*	*	*	*	36	37						
04:00	*	*	*	*	*	*	36	30	30	*	*	*	*	*	*	*	*	*	*	*	*	*	36	30						
05:00	*	*	*	*	*	*	35	55	55	*	*	*	*	*	*	*	*	*	*	*	*	*	35	55						
06:00	*	*	*	*	*	*	17	22	22	*	*	*	*	*	*	*	*	*	*	*	*	*	17	22						
07:00	*	*	*	*	*	*	21	20	20	*	*	*	*	*	*	*	*	*	*	*	*	*	21	20						
08:00	*	*	*	*	*	*	11	11	11	*	*	*	*	*	*	*	*	*	*	*	*	*	11	11						
09:00	*	*	*	*	*	*	7	11	11	*	*	*	*	*	*	*	*	*	*	*	*	*	7	11						
10:00	*	*	*	*	*	*	0	0	0	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0						
11:00	*	*	*	*	*	*	0	0	0	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0						
Lane	0	0	0	0	0	0	607	349	956	0	0	0	0	0	0	0	0	0	0	0	0	0	607	349						
Day	0	0	0	0	0	0	956	349	0	0	0	0	0	0	0	0	0	0	0	0	0	0	956	349						
AM Peak Vol.	-	-	-	-	-	-	07:00	07:00	07:00	-	-	-	-	-	-	-	-	-	-	-	-	-	07:00	07:00						
PM Peak Vol.	-	-	-	-	-	-	15:00	17:00	17:00	-	-	-	-	-	-	-	-	-	-	-	-	-	15:00	17:00						
	-	-	-	-	-	-	36	55	55	-	-	-	-	-	-	-	-	-	-	-	-	-	36	55						

	0	0	956	0	0	0	956
Comb.	0	0	0	0	0	0	0
Total	0	0	956	0	0	0	956

ISSAQUAH, WASHINGTON  
COSTCO HQ NW DRIVEWAY S/O  
LAKE DR  
LOC# 01 V TSI17077TM

Site Code: 01

**Date Start: 12-Jul-17**  
**Date End: 12-Jul-17**

Start Time	10-Jul-17				Tue		Wed		Thu		Fri		Sat		Sun		Week Average	
	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB
12:00 AM	*	*	*	*	1	0	*	*	*	*	*	*	*	*	*	*	1	0
01:00	*	*	*	*	0	1	*	*	*	*	*	*	*	*	*	*	0	1
02:00	*	*	*	*	0	0	*	*	*	*	*	*	*	*	*	*	0	0
03:00	*	*	*	*	0	0	*	*	*	*	*	*	*	*	*	*	0	0
04:00	*	*	*	*	5	2	*	*	*	*	*	*	*	*	*	*	5	2
05:00	*	*	*	*	22	6	*	*	*	*	*	*	*	*	*	*	22	6
06:00	*	*	*	*	53	24	*	*	*	*	*	*	*	*	*	*	53	24
07:00	*	*	*	*	60	27	*	*	*	*	*	*	*	*	*	*	60	27
08:00	*	*	*	*	42	13	*	*	*	*	*	*	*	*	*	*	42	13
09:00	*	*	*	*	20	15	*	*	*	*	*	*	*	*	*	*	20	15
10:00	*	*	*	*	37	14	*	*	*	*	*	*	*	*	*	*	37	14
11:00	*	*	*	*	57	31	*	*	*	*	*	*	*	*	*	*	57	31
12:00 PM	*	*	*	*	75	32	*	*	*	*	*	*	*	*	*	*	75	32
01:00	*	*	*	*	42	64	*	*	*	*	*	*	*	*	*	*	42	64
02:00	*	*	*	*	36	48	*	*	*	*	*	*	*	*	*	*	36	48
03:00	*	*	*	*	43	66	*	*	*	*	*	*	*	*	*	*	43	66
04:00	*	*	*	*	50	87	*	*	*	*	*	*	*	*	*	*	50	87
05:00	*	*	*	*	45	109	*	*	*	*	*	*	*	*	*	*	45	109
06:00	*	*	*	*	23	57	*	*	*	*	*	*	*	*	*	*	23	57
07:00	*	*	*	*	18	45	*	*	*	*	*	*	*	*	*	*	18	45
08:00	*	*	*	*	13	23	*	*	*	*	*	*	*	*	*	*	13	23
09:00	*	*	*	*	12	20	*	*	*	*	*	*	*	*	*	*	12	20
10:00	*	*	*	*	4	18	*	*	*	*	*	*	*	*	*	*	4	18
11:00	*	*	*	*	1	0	*	*	*	*	*	*	*	*	*	*	1	0
Lane	0	0	0	0	659	702	0	0	0	0	0	0	0	0	0	0	659	702
Day	0		0		1361		0		0		0		0		0		1361	
AM Peak Vol.	-	-	-	-	07:00	11:00	-	-	-	-	-	-	-	-	-	-	07:00	11:00
PM Peak Vol.	-	-	-	-	12:00	17:00	-	-	-	-	-	-	-	-	-	-	12:00	17:00

[illegible]

ADT	ADT 1,361	AADT 1,361
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Prepared for:

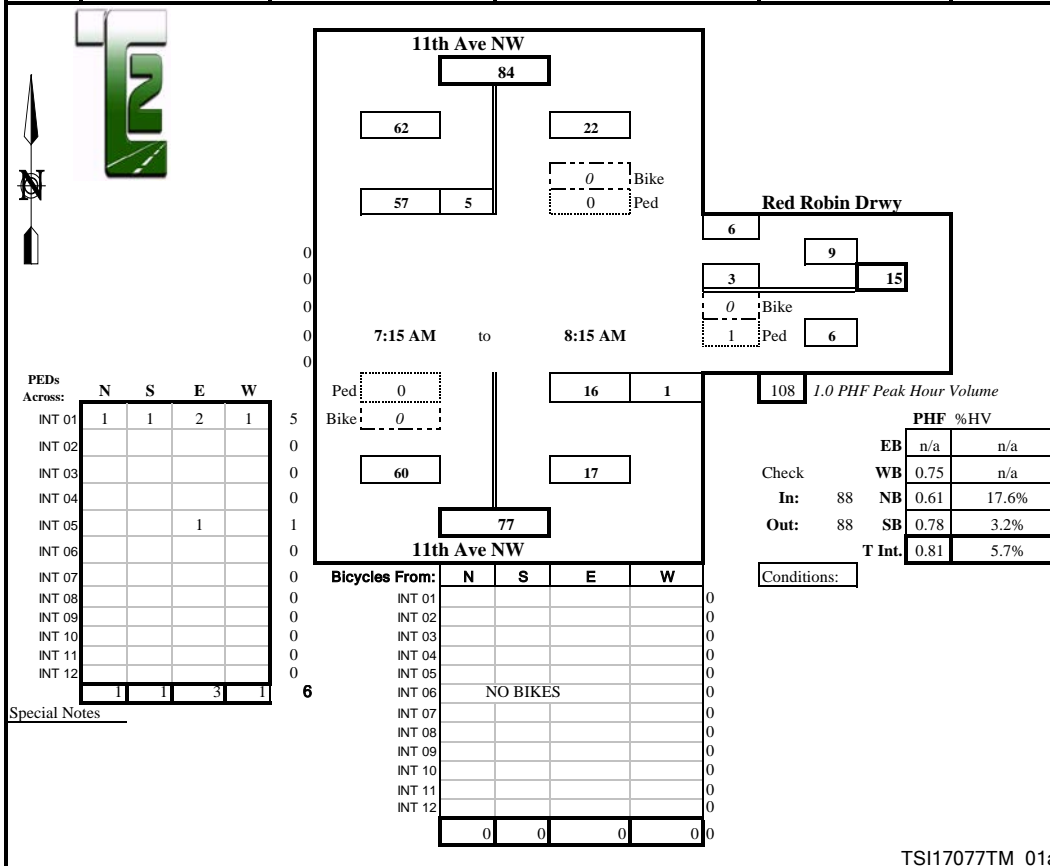
**Transportation Solutions, Inc.****Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** 11th Ave NW & Red Robin Drwy**Date of Count:** Wed 7/12/2017**Location:** Issaquah, Washington**Checked By:** Jess

Time Interval	From North on (SB) 11th Ave NW				From South on (NB) 11th Ave NW				From East on (WB) Red Robin Drwy				From West on (EB) 0				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	1	15	0	0	0	1	0	0	0	0	1	0	0	0	0	18
7:30 A	1	1	16	0	0	0	3	0	0	2	0	1	0	0	0	0	23
7:45 A	0	1	14	0	1	0	2	0	0	0	0	1	0	0	0	0	18
8:00 A	1	2	18	0	1	0	5	0	0	1	0	1	0	0	0	0	27
8:15 A	0	1	9	0	1	0	6	1	0	0	0	3	0	0	0	0	20
8:30 A	0	2	8	0	0	0	3	0	0	0	0	1	0	0	0	0	14
8:45 A	0	3	19	0	0	0	5	0	0	0	0	0	0	0	0	0	27
9:00 A	1	3	5	0	0	0	2	1	1	0	0	3	0	0	0	0	14
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	3	14	104	0	3	0	27	2	1	3	0	11	0	0	0	0	161
Peak Hour: 7:15 AM to 8:15 AM																	
Total	2	5	57	0	3	0	16	1	0	3	0	6	0	0	0	0	88
Approach	62				17				9				0				88
%HV	3.2%				17.6%				n/a				n/a				5.7%
PHF	0.78				0.61				0.75				n/a				0.81



TSI17077TM\_01a



Prepared for:

**Transportation Solutions, Inc.****Traffic Count Consultants, Inc.**

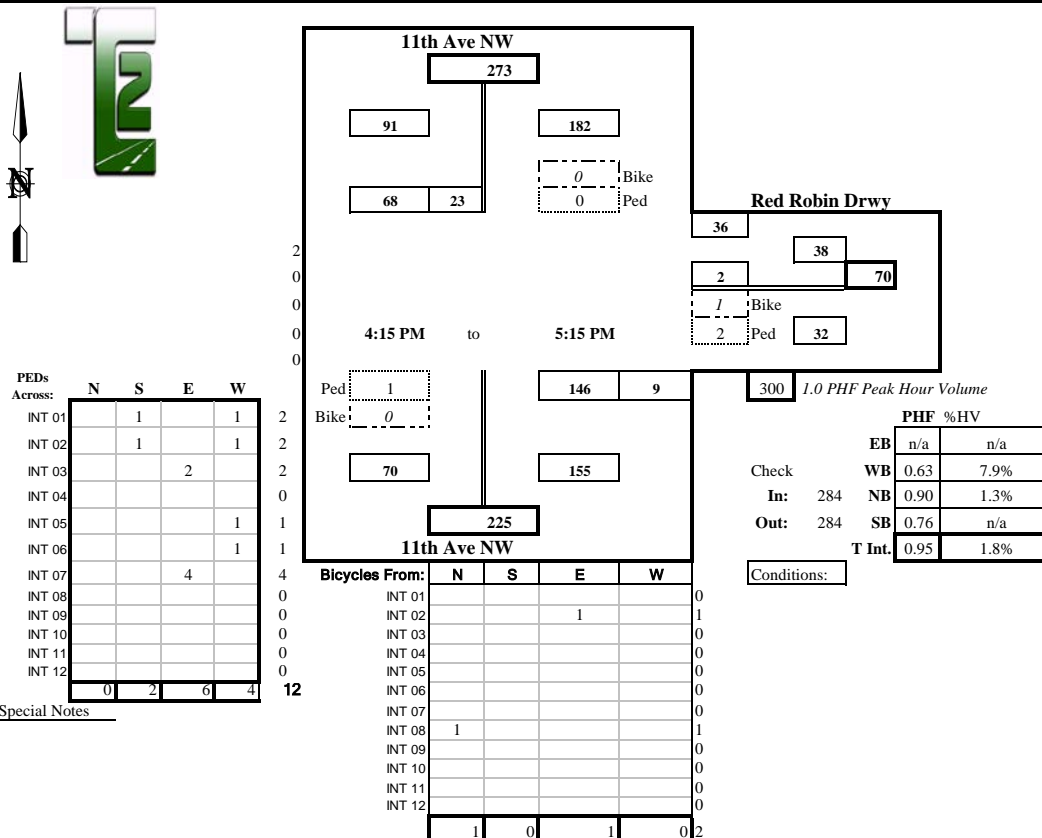
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** 11th Ave NW & Red Robin Drwy**Date of Count:** Wed 7/12/2017**Location:** Issaquah, Washington**Checked By:** Jess

Time Interval	From North on (SB) 11th Ave NW				From South on (NB) 11th Ave NW				From East on (WB) Red Robin Drwy				From West on (EB) 0				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	5	6	0	0	0	28	0	0	1	0	4	0	0	0	0	44
4:30 P	0	6	24	0	0	0	35	0	0	0	0	9	0	0	0	0	74
4:45 P	0	4	19	0	2	0	33	2	0	2	0	4	0	0	0	0	64
5:00 P	0	9	12	0	0	0	38	4	1	0	0	8	0	0	0	0	71
5:15 P	0	4	13	0	0	0	40	3	2	0	0	15	0	0	0	0	75
5:30 P	0	5	10	0	0	0	40	4	0	0	0	9	0	0	0	0	68
5:45 P	0	6	13	0	0	0	24	0	0	0	0	9	0	0	0	0	52
6:00 P	0	11	18	0	0	0	38	0	0	1	0	4	0	0	0	0	72
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	0	50	115	0	2	0	276	13	3	4	0	62	0	0	0	0	520
Peak Hour: 4:15 PM to 5:15 PM																	
Total	0	23	68	0	2	0	146	9	3	2	0	36	0	0	0	0	284
Approach	91				155				38				0				284
%HV	n/a				1.3%				7.9%				n/a				1.8%
PHF	0.76				0.90				0.63				n/a				0.95



TS117077TM\_01p



Prepared for:

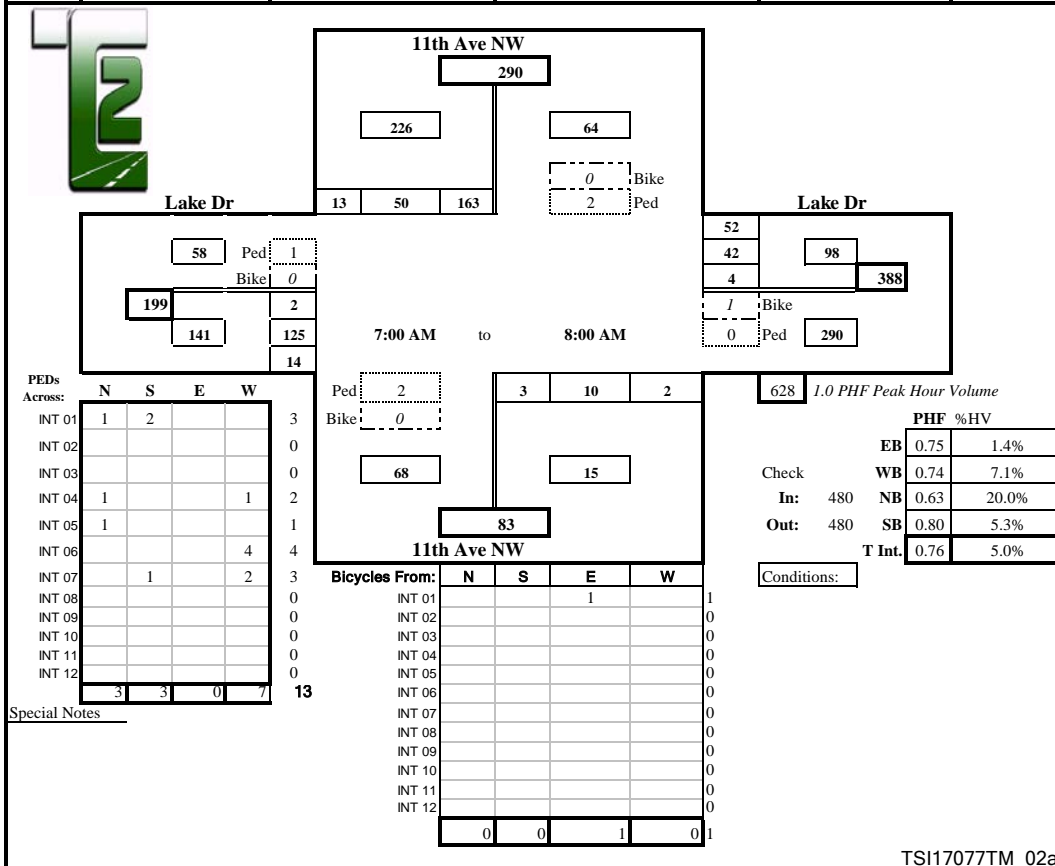
**Transportation Solutions, Inc.****Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** 11th Ave NW & Lake Dr**Date of Count:** Wed 7/12/2017**Location:** Issaquah, Washington**Checked By:** Jess

Time Interval	From North on (SB) 11th Ave NW				From South on (NB) 11th Ave NW				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	2	29	12	3	0	1	1	0	1	1	8	9	0	0	28	3	95
7:30 A	4	31	15	2	0	1	2	1	2	2	5	12	1	1	29	0	101
7:45 A	3	48	12	3	2	0	3	0	2	0	16	12	0	1	29	3	127
8:00 A	3	55	11	5	1	1	4	1	2	1	13	19	1	0	39	8	157
8:15 A	2	25	7	2	2	2	7	0	1	0	14	8	0	3	17	3	88
8:30 A	3	23	7	4	0	2	2	0	1	2	9	16	2	2	10	1	78
8:45 A	1	9	8	4	1	0	2	3	4	10	10	12	0	5	11	4	78
9:00 A	4	22	5	1	2	0	5	0	2	0	19	13	1	3	17	3	88
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	22	242	77	24	8	7	26	5	15	16	94	101	5	15	180	25	812
Peak Hour: 7:00 AM to 8:00 AM																	
Total	12	163	50	13	3	3	10	2	7	4	42	52	2	2	125	14	480
Approach	226				15				98				141				480
%HV	5.3%				20.0%				7.1%				1.4%				5.0%
PHF	0.80				0.63				0.74				0.75				0.76



TSI17077TM\_02a



Prepared for:

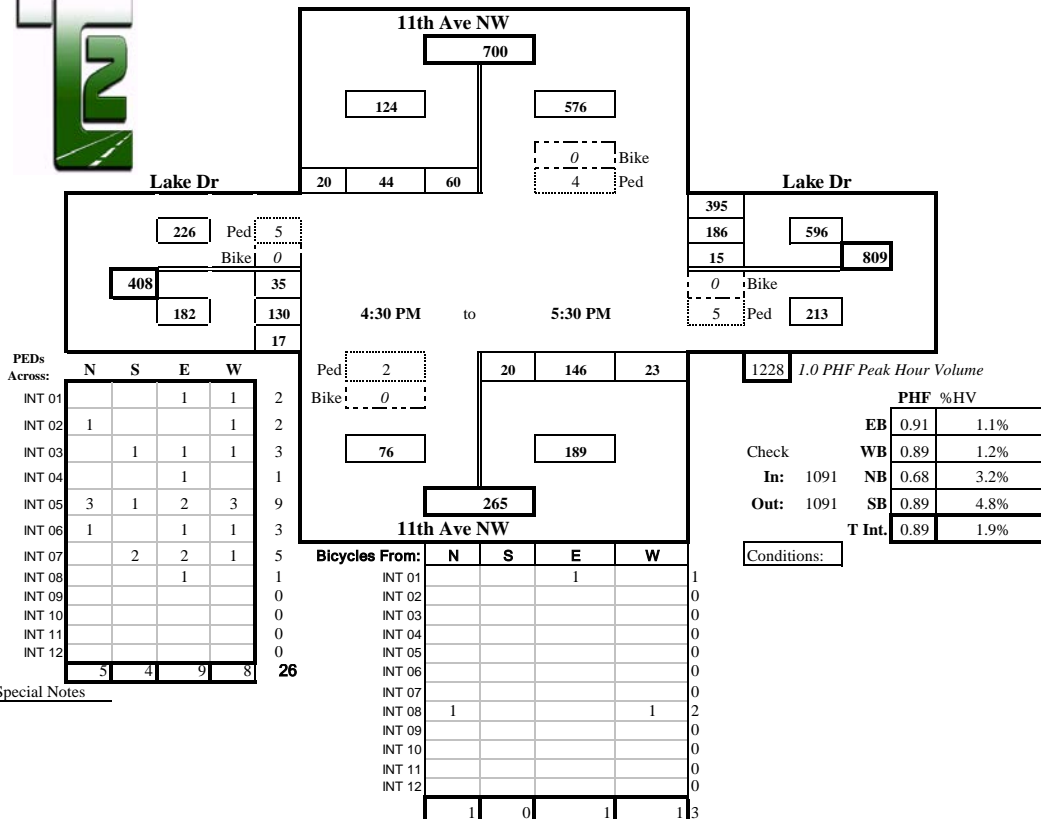
**Transportation Solutions, Inc.****Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** 11th Ave NW & Lake Dr**Date of Count:** Wed 7/12/2017**Location:** Issaquah, Washington**Checked By:** Jess

Time Interval	From North on (SB) 11th Ave NW				From South on (NB) 11th Ave NW				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	1	8	6	11	0	0	25	7	4	2	44	84	1	6	19	3	215
4:30 P	2	14	16	4	2	6	35	3	3	6	36	66	0	11	28	8	233
4:45 P	2	12	16	6	3	3	30	4	1	4	48	106	1	10	27	3	269
5:00 P	1	20	11	4	1	4	36	5	2	7	43	78	1	7	38	3	256
5:15 P	1	12	9	6	2	11	47	11	3	1	57	109	0	7	30	7	307
5:30 P	2	16	8	4	0	2	33	3	1	3	38	102	0	11	35	4	259
5:45 P	3	14	11	8	2	5	25	7	3	4	53	59	1	10	32	4	232
6:00 P	2	17	16	3	0	1	29	6	1	5	31	64	0	8	37	8	225
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	14	113	93	46	10	32	260	46	18	32	350	668	4	70	246	40	1996
Peak Hour: 4:30 PM to 5:30 PM																	
Total	6	60	44	20	6	20	146	23	7	15	186	395	2	35	130	17	1091
Approach	124				189				596				182				1091
%HV	4.8%				3.2%				1.2%				1.1%				1.9%
PHF	0.89				0.68				0.89				0.91				0.89







Prepared for: **Transportation Solutions, Inc.**

**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

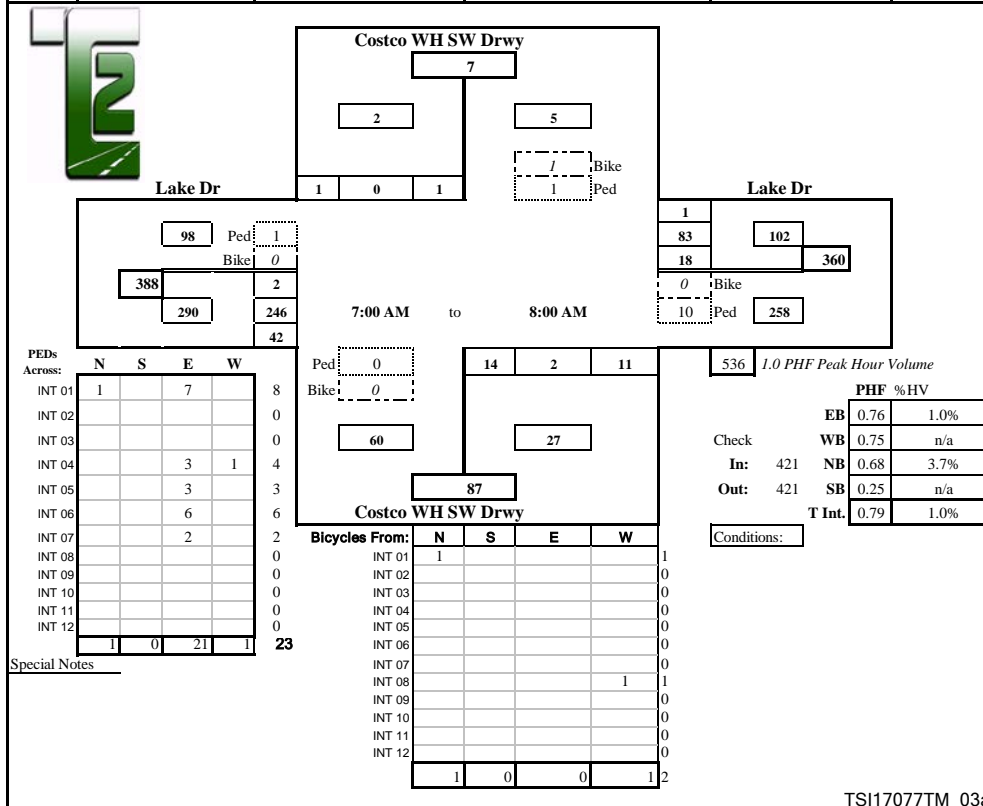
**Intersection:** Costco Warehouse SW Drwy & Lake Dr

**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

**Checked By:** Jess

Time Interval Ending at	From North on (SB) Costco WH SW Drwy				From South on (NB) Costco WH SW Drwy				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	0	0	0	5	0	5	0	8	13	0	1	1	39	17	88
7:30 A	0	1	0	1	1	4	1	1	0	3	14	0	1	0	52	9	86
7:45 A	0	0	0	0	0	3	0	3	0	4	25	1	1	1	67	9	113
8:00 A	0	0	0	0	0	2	1	2	0	3	31	0	0	0	88	7	134
8:15 A	0	0	0	0	0	4	0	0	0	6	18	1	0	2	34	6	71
8:30 A	0	0	0	2	0	2	0	1	2	4	23	0	2	1	22	10	65
8:45 A	0	0	0	0	1	3	0	0	0	2	29	0	0	0	20	3	57
9:00 A	0	0	0	0	0	2	0	1	0	5	30	0	1	2	31	6	77
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Survey	0	1	0	3	2	25	2	13	2	35	183	2	6	7	353	67	691
Peak Hour: 7:00 AM to 8:00 AM																	
Total	0	1	0	1	1	14	2	11	0	18	83	1	3	2	246	42	421
Approach	2				27				102				290				421
%HV	n/a				3.7%				n/a				1.0%				1.0%
PHF	0.25				0.68				0.75				0.76				0.79



TS117077TM\_03a



Prepared for: **Transportation Solutions, Inc.**

**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Costco Warehouse SW Drwy & Lake Dr

**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

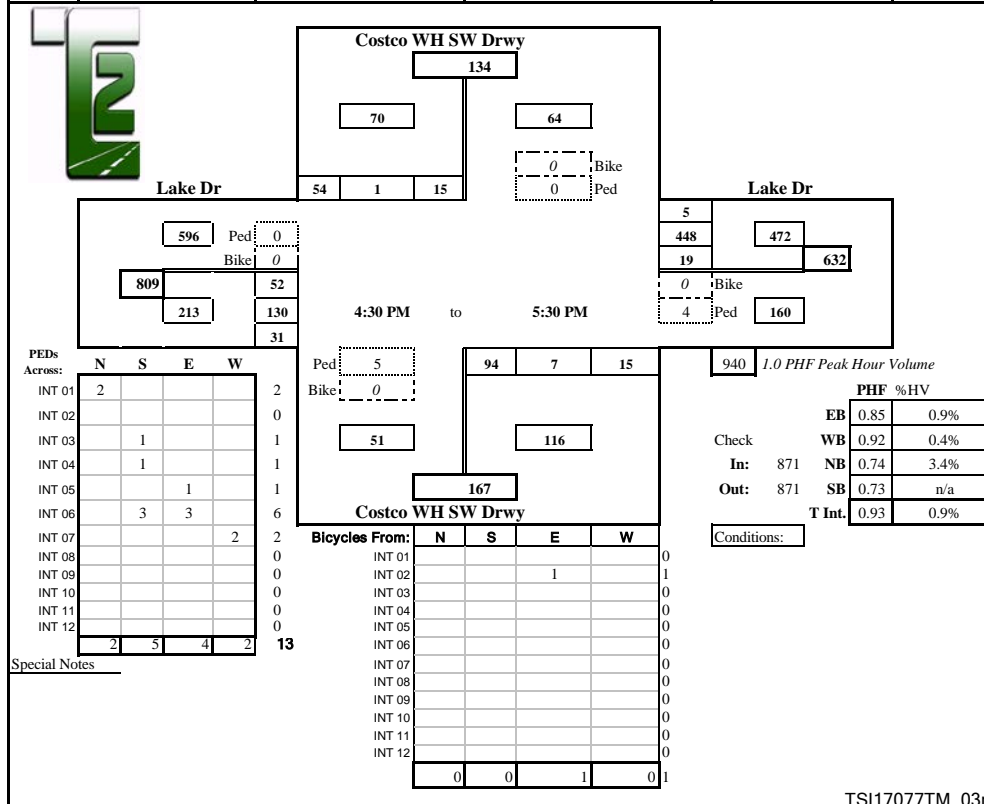
**Checked By:** Jess

Time Interval Ending at	From North on (SB) Costco WH SW Drwy				From South on (NB) Costco WH SW Drwy				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	3	0	13	0	25	2	2	0	9	92	2	0	9	23	2	182
4:30 P	0	6	0	11	0	7	0	3	2	9	90	0	0	15	27	3	171
4:45 P	0	4	0	20	1	25	1	5	2	6	113	3	1	13	21	9	220
5:00 P	0	6	0	9	2	13	2	2	0	3	106	1	1	13	41	9	205
5:15 P	0	2	1	12	1	34	2	3	0	7	121	0	0	8	38	7	235
5:30 P	0	3	0	13	0	22	2	5	0	3	108	1	0	18	30	6	211
5:45 P	0	8	0	12	0	17	0	3	0	13	87	0	0	19	28	6	193
6:00 P	0	8	1	11	0	16	1	4	0	0	73	1	0	17	40	3	175
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total																	
Survey	0	40	2	101	4	159	10	27	4	50	790	8	2	112	248	45	1592

Peak Hour: 4:30 PM to 5:30 PM																	
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Total	0	15	1	54	4	94	7	15	2	19	448	5	2	52	130	31	871
Approach	70				116				472				213				871
%HV	n/a				3.4%				0.4%				0.9%				0.9%
PHF	0.73				0.74				0.92				0.85				0.93



TS117077TM\_03p



Prepared for:

**Transportation Solutions, Inc.**

**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Costco Warehouse SE Drwy & Lake Dr

**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

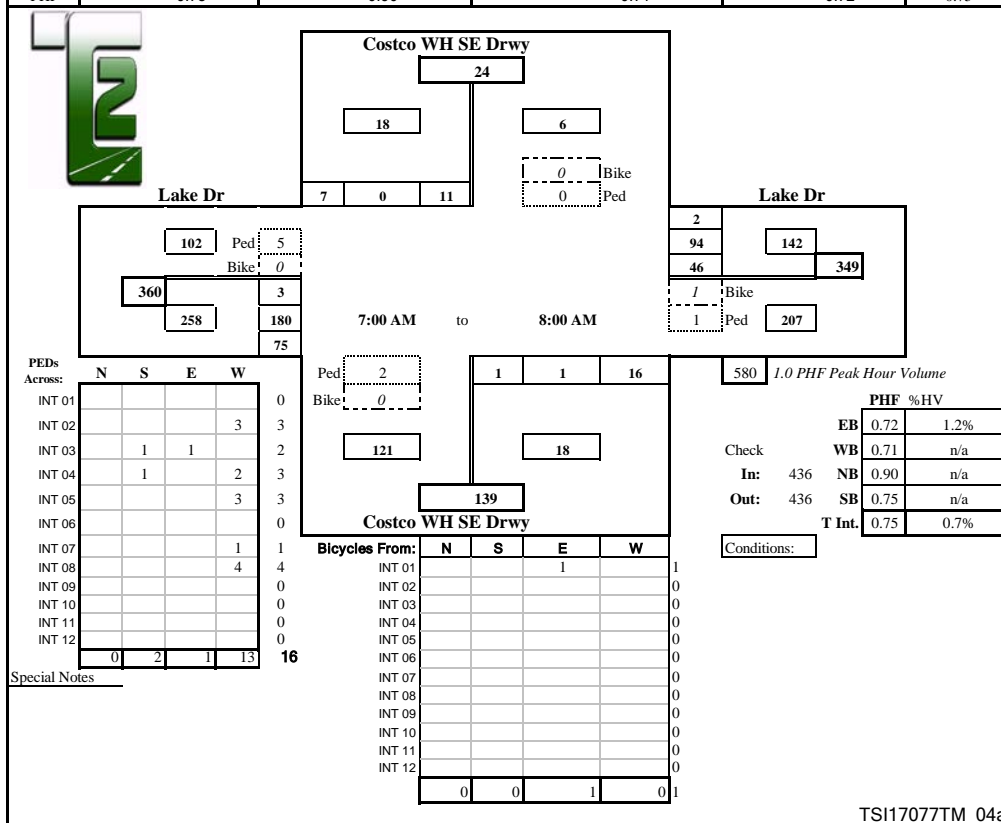
**Checked By:** Jess

Time Interval Ending at	From North on (SB) Costco WH SE Drwy				From South on (NB) Costco WH SE Drwy				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	4	0	2	0	1	1	3	0	7	18	0	0	0	26	18	80
7:30 A	0	2	0	4	0	0	0	5	0	10	13	0	2	1	40	13	88
7:45 A	0	3	0	1	0	0	0	5	0	14	29	1	1	1	52	17	123
8:00 A	0	2	0	0	0	0	0	3	0	15	34	1	0	1	62	27	145
8:15 A	0	1	0	1	0	0	0	6	0	7	24	0	0	0	24	10	73
8:30 A	0	1	0	4	0	0	0	1	1	2	23	1	1	0	15	8	55
8:45 A	0	0	0	1	0	0	0	0	1	4	30	1	0	1	15	4	56
9:00 A	0	0	0	5	0	0	0	4	0	5	30	0	1	2	22	8	76
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	0	13	0	18	0	1	1	27	2	64	201	4	5	6	256	105	696
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Peak Hour: 7:00 AM to 8:00 AM

Total	0	11	0	7	0	1	1	16	0	46	94	2	3	3	180	75	436
Approach	18				18				142				258				436
%HV	n/a				n/a				n/a				1.2%				0.7%
PHF	0.75				0.90				0.71				0.72				0.75



TS117077TM\_04a

Prepared for:

**Transportation Solutions, Inc.**

***Traffic Count Consultants, Inc.***

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: [Team@TC2inc.com](mailto:Team@TC2inc.com)

WBE/DBE

**Intersection:** Costco Warehouse SE Drwy & Lake Dr

Date of Count: Wed 7/12/2017

**Location:** Issaquah, Washington

**Checked By:** Jess

[illegible]

Total																		
Survey	0	118	4	209	0	2	3	80	4	53	637	79	2	59	249	14	1507	

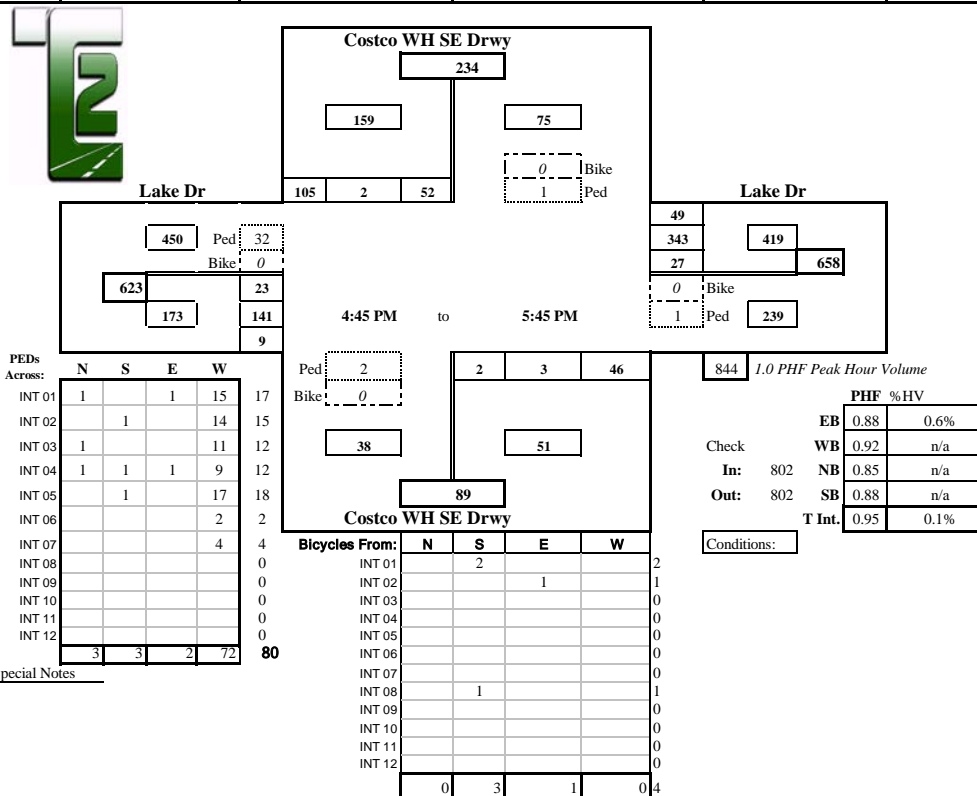
	Peak Hour: 4:45 PM to 5:45 PM
--	-------------------------------

Total	0	52	2	105	0	2	3	46	0	27	343	49	1	23	141	9	802
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Approach	159	51	419	173	802
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%HV	n/a	n/a	n/a	0.6%	0.1%
-----	-----	-----	-----	------	------

PHF	0.88	0.85	0.92	0.88	0.95
-----	------	------	------	------	------



TSI17077TM 04p





Prepared for:

**Transportation Solutions, Inc.**

**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** 10th Ave NW & Lake Dr

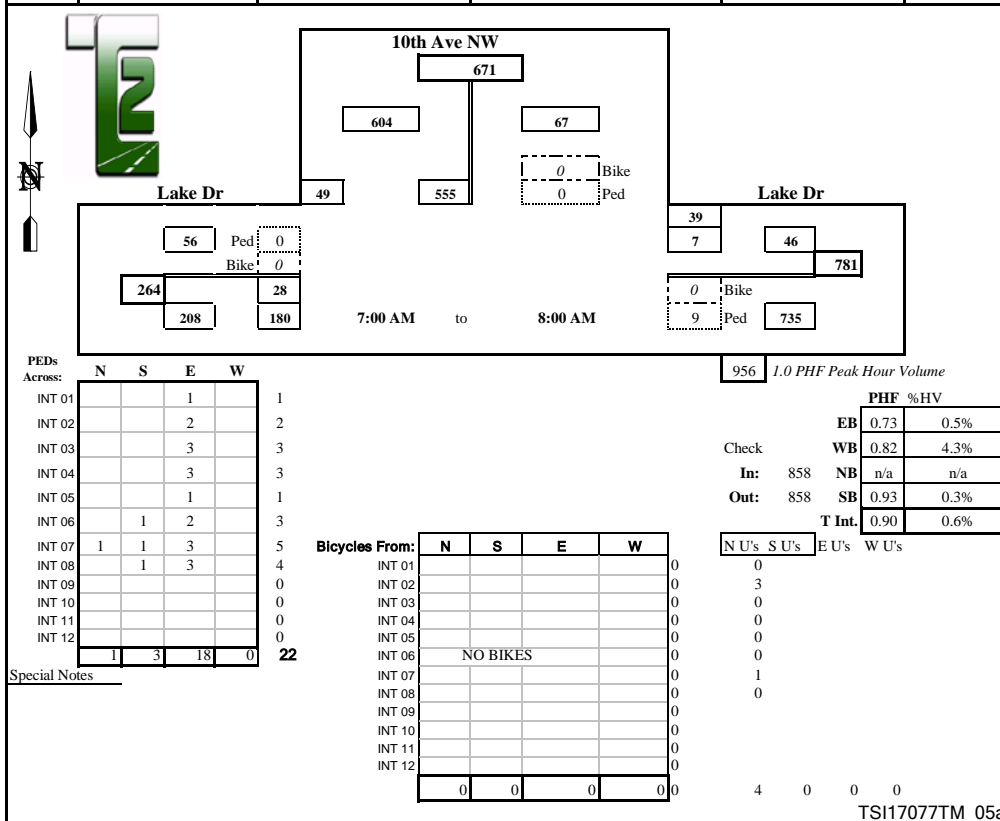
**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

**Checked By:** Jess

Time Interval Ending at	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
	10th Ave NW				0				Lake Dr				Lake Dr				
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	121	0	6	0	0	0	0	1	0	1	13	0	6	29	0	176
7:30 A	1	146	0	10	0	0	0	0	0	0	1	8	0	7	40	0	212
7:45 A	0	147	0	15	0	0	0	0	0	0	1	13	1	6	49	0	231
8:00 A	1	141	0	18	0	0	0	0	1	0	4	5	0	9	62	0	239
8:15 A	0	93	0	16	0	0	0	0	1	0	0	6	0	7	26	0	148
8:30 A	2	53	0	9	0	0	0	0	0	0	1	4	1	4	13	0	84
8:45 A	0	42	0	6	0	0	0	0	2	0	2	11	0	5	10	0	76
9:00 A	1	32	0	7	0	0	0	0	0	0	6	9	0	5	18	0	77
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	5	775	0	87	0	0	0	0	5	0	16	69	2	49	247	0	1243
Peak Hour: 7:00 AM to 8:00 AM																	
Total	2	555	0	49	0	0	0	0	2	0	7	39	1	28	180	0	858
Approach	604				0				46				208				858
%HV	0.3%				n/a				4.3%				0.5%				0.6%
PHF	0.93				n/a				0.82				0.73				0.90





Prepared for:

**Transportation Solutions, Inc.****Traffic Count Consultants, Inc.**

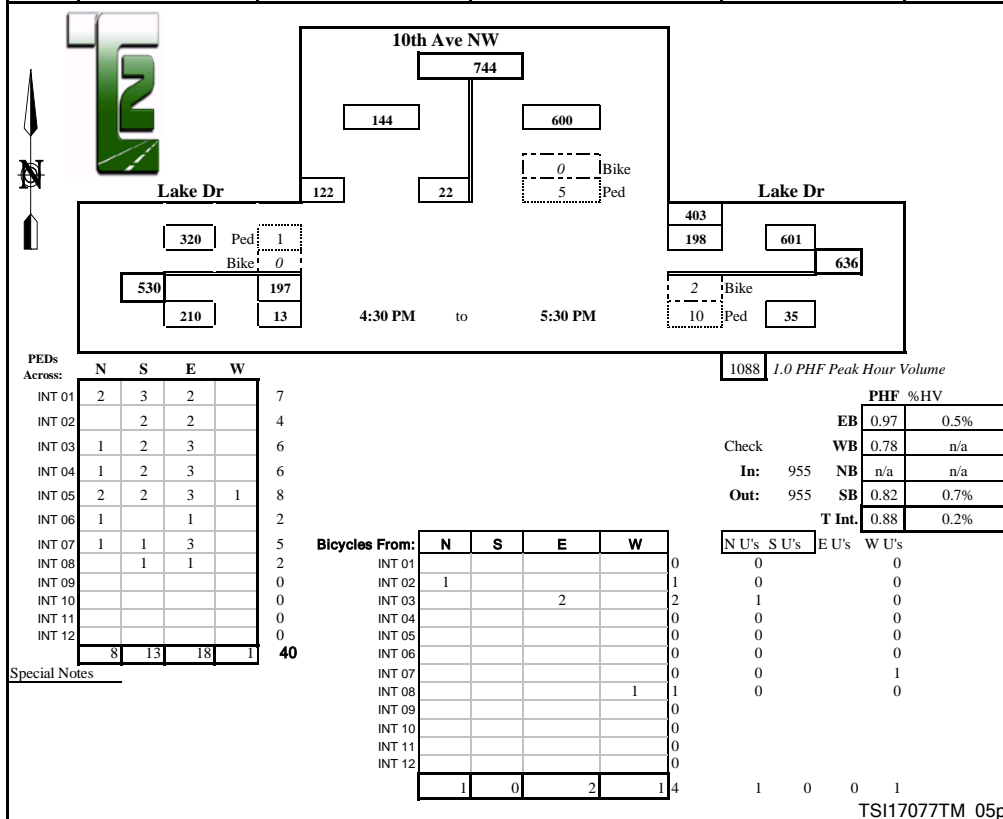
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** 10th Ave NW & Lake Dr**Date of Count:** Wed 7/12/2017**Location:** Issaquah, Washington**Checked By:** Jess

Time Interval	From North on (SB) 10th Ave NW				From South on (NB) 0				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	7	0	24	0	0	0	0	1	0	43	87	0	32	3	0	196
4:30 P	1	7	0	15	0	0	0	0	2	0	34	49	0	54	2	0	161
4:45 P	1	6	0	24	0	0	0	0	0	0	59	133	0	47	3	0	272
5:00 P	0	7	0	37	0	0	0	0	0	0	34	61	1	52	2	0	193
5:15 P	0	6	0	26	0	0	0	0	0	0	57	119	0	49	5	0	262
5:30 P	0	3	0	35	0	0	0	0	0	0	48	90	0	49	3	0	228
5:45 P	0	7	0	28	0	0	0	0	0	0	34	69	0	63	4	0	205
6:00 P	0	2	0	11	0	0	0	0	0	0	21	58	0	58	3	0	153
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	2	45	0	200	0	0	0	0	3	0	330	666	1	404	25	0	1670
Peak Hour: 4:30 PM to 5:30 PM																	
Total	1	22	0	122	0	0	0	0	0	0	198	403	1	197	13	0	955
Approach	144				0				601				210				955
%HV	0.7%				n/a				n/a				0.5%				0.2%
PHF	0.82				n/a				0.78				0.97				0.88





Prepared for:

**Transportation Solutions, Inc.**

**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Lake Dr & Costco HQ NE Drwy

**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

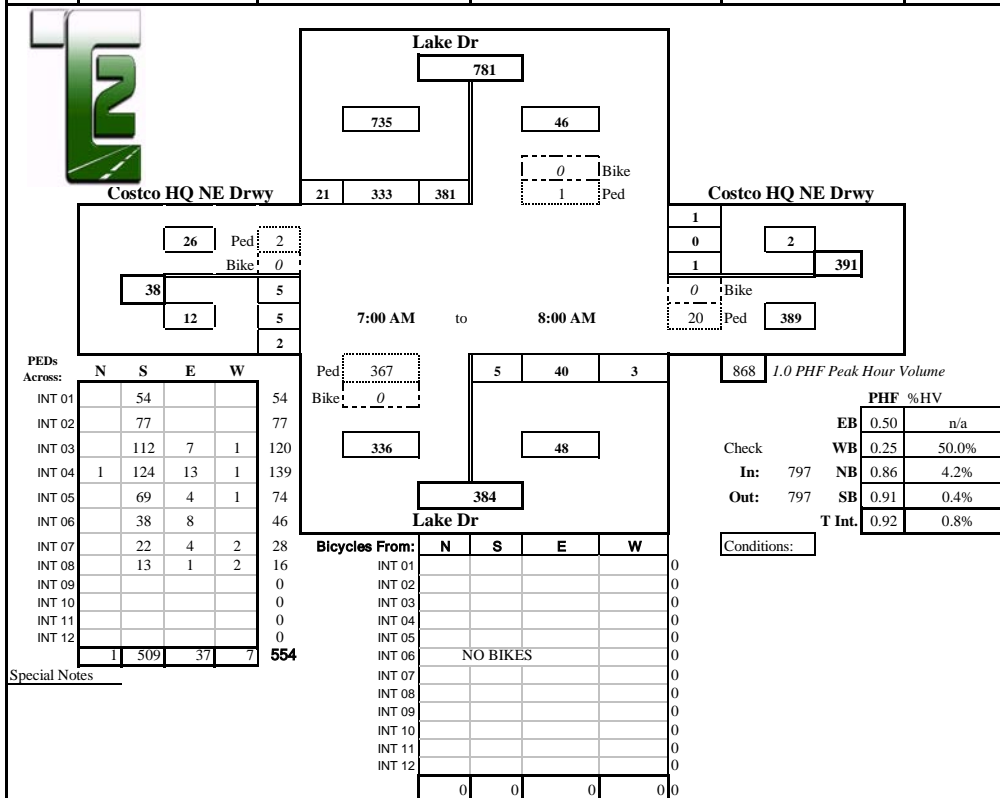
**Checked By:** Jess

Time Interval Ending at	From North on (SB) Lake Dr				From South on (NB) Lake Dr				From East on (WB) Costco HQ NE Drwy				From West on (EB) Costco HQ NE Drwy				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	70	76	4	1	1	13	0	0	0	0	0	0	1	0	1	166
7:30 A	1	84	98	4	0	2	8	2	0	0	0	0	0	1	2	0	201
7:45 A	1	128	60	8	0	1	11	1	1	1	0	1	0	2	3	1	217
8:00 A	1	99	99	5	1	1	8	0	0	0	0	0	0	1	0	0	213
8:15 A	0	64	53	2	1	2	6	0	0	0	0	0	0	0	1	0	128
8:30 A	2	35	26	5	0	1	4	0	0	0	1	0	0	1	0	0	73
8:45 A	0	26	19	7	2	2	11	1	0	1	0	0	0	2	0	2	71
9:00 A	1	11	24	15	0	1	8	0	0	0	0	2	1	5	0	1	67
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	6	517	455	50	5	11	69	4	1	2	1	3	1	13	6	5	1136
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Peak Hour: 7:00 AM to 8:00 AM

Total	3	381	333	21	2	5	40	3	1	1	0	1	0	5	5	2	797
Approach	735				48				2				12				797
%HV	0.4%				4.2%				50.0%				n/a				0.8%
PHF	0.91				0.86				0.25				0.50				0.92



TS117077TM\_06a



Prepared for: **Transportation Solutions, Inc.**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Lake Dr & Costco HQ NE Drwy

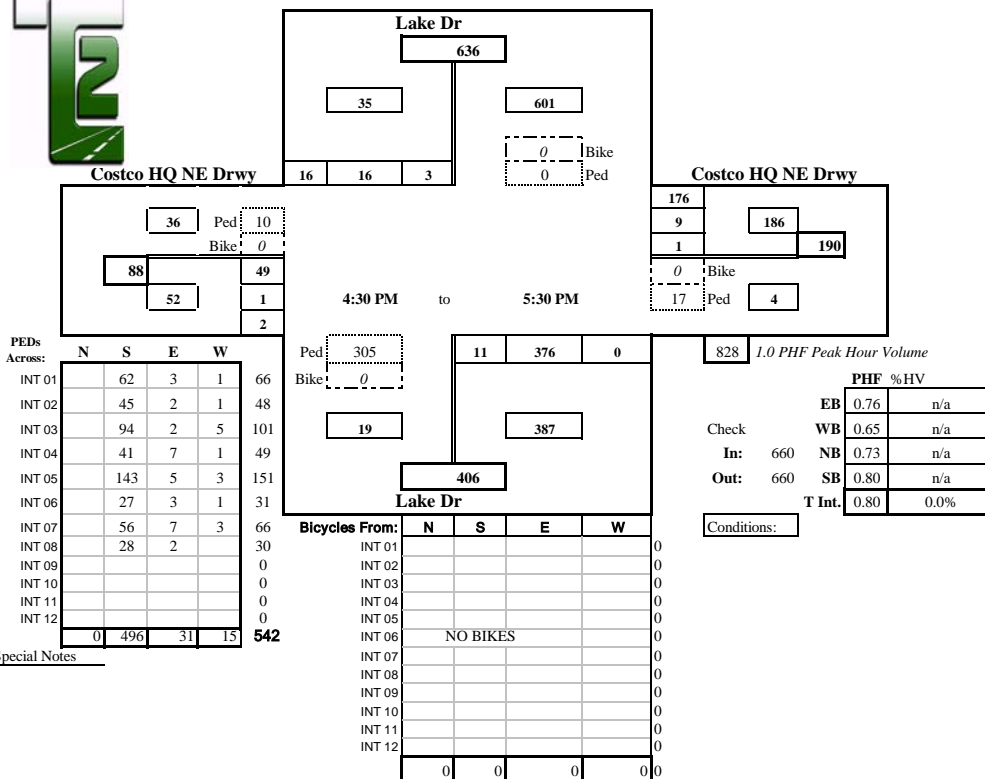
**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

**Checked By:** Jess

Time Interval Ending at	From North on (SB) Lake Dr				From South on (NB) Lake Dr				From East on (WB) Costco HQ NE Drwy				From West on (EB) Costco HQ NE Drwy				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	1	7	2	1	3	91	0	0	1	1	29	0	10	0	0	145
4:30 P	1	1	3	5	3	3	61	2	0	0	0	14	0	8	0	0	97
4:45 P	0	2	5	2	0	3	130	0	0	0	3	51	0	11	0	0	207
5:00 P	0	0	6	3	0	4	64	0	0	0	3	21	0	10	0	1	112
5:15 P	0	0	3	8	0	3	93	0	0	1	3	68	0	15	1	1	196
5:30 P	0	1	2	3	0	1	89	0	0	0	0	36	0	13	0	0	145
5:45 P	0	2	5	4	0	3	71	0	0	0	1	28	0	4	0	0	118
6:00 P	0	0	4	1	0	0	57	0	0	0	1	20	0	2	0	0	85
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	1	7	35	28	4	20	656	2	0	2	12	267	0	73	1	2	1105
Peak Hour: 4:30 PM to 5:30 PM																	
Total	0	3	16	16	0	11	376	0	0	1	9	176	0	49	1	2	660
Approach	35				387				186				52				660
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.80				0.73				0.65				0.76				0.80



TS117077TM\_06p



Prepared for:

**Transportation Solutions, Inc.**

**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Lake Dr & Costco HQ E1 Drwy

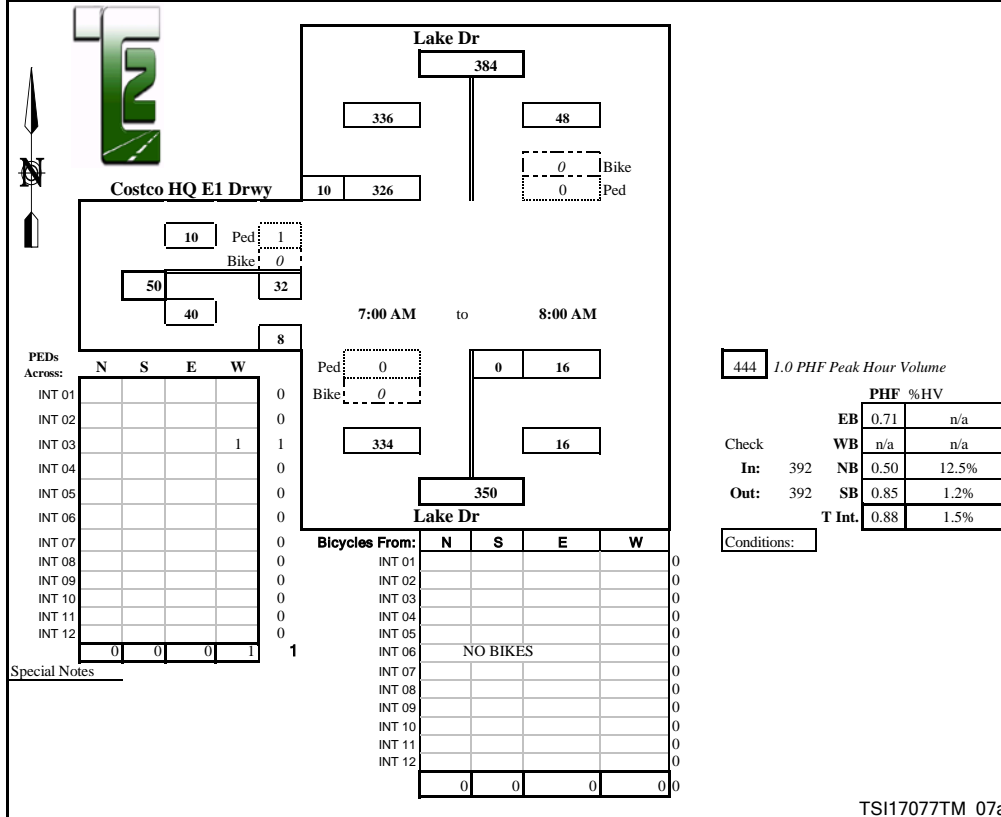
**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

**Checked By:** Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
Ending at	Lake Dr				Lake Dr				0				Costco HQ E1 Drwy				
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	74	3	1	0	3	0	0	0	0	0	0	11	0	3	94
7:30 A	1	0	97	1	0	0	8	0	0	0	0	0	0	4	0	1	111
7:45 A	2	0	58	4	0	0	5	0	0	0	0	0	0	8	0	1	76
8:00 A	1	0	97	2	1	0	0	0	0	0	0	0	0	9	0	3	111
8:15 A	0	0	52	1	1	0	3	0	0	0	0	0	0	5	0	0	61
8:30 A	1	0	24	2	0	1	0	0	0	0	0	0	0	5	0	0	32
8:45 A	0	0	22	0	2	1	7	0	0	0	0	0	0	7	0	1	38
9:00 A	1	0	22	3	0	0	2	0	0	0	0	0	0	7	0	0	34
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	6	0	446	16	5	2	28	0	0	0	0	0	0	56	0	9	557
Peak Hour: 7:00 AM to 8:00 AM																	
Total	4	0	326	10	2	0	16	0	0	0	0	0	0	32	0	8	392
Approach	336				16				0				40				392
%HV	1.2%				12.5%				n/a				n/a				1.5%
PHF	0.85				0.50				n/a				0.71				0.88



TS117077TM\_07a





Prepared for:

**Transportation Solutions, Inc.****Traffic Count Consultants, Inc.**

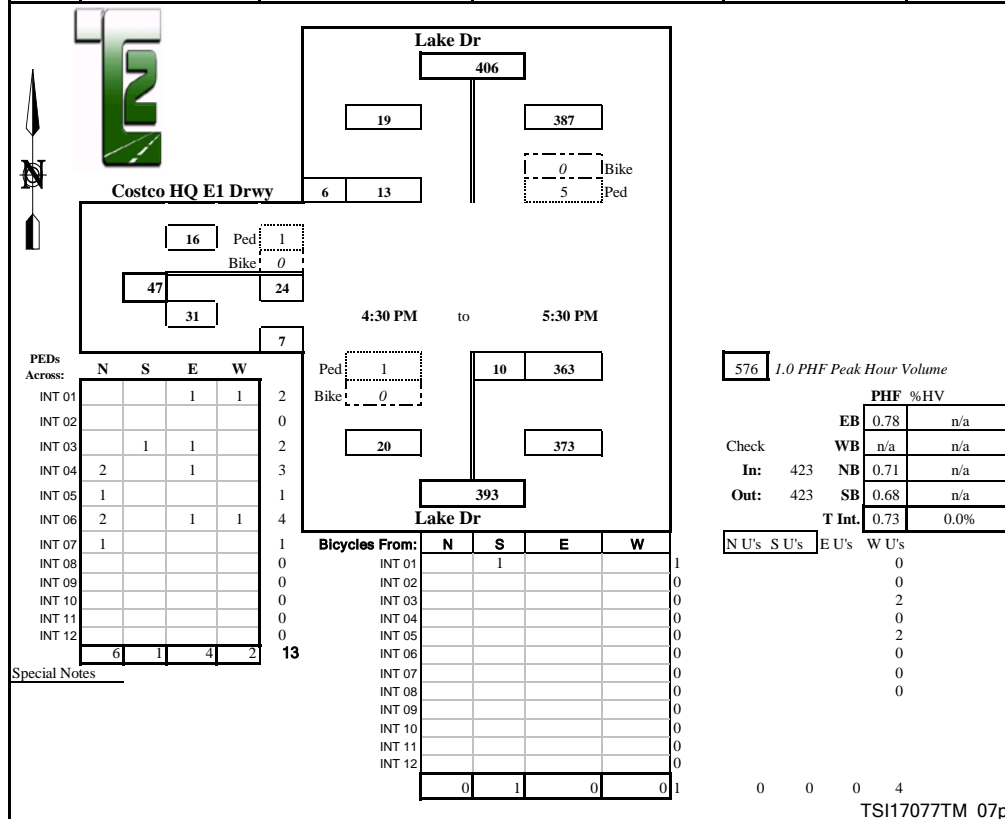
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Lake Dr & Costco HQ E1 Drwy**Date of Count:** Wed 7/12/2017**Location:** Issaquah, Washington**Checked By:** Jess

Time Interval	From North on (SB)				From South on (NB)				From East on (WB)				From West on (EB)				Interval Total
Ending at	Lake Dr				Lake Dr				0				Costco HQ E1 Drwy				
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	7	1	1	3	81	0	0	0	0	0	0	13	0	1	106
4:30 P	0	0	2	1	2	1	61	0	0	0	0	0	0	6	0	0	71
4:45 P	0	0	3	2	0	5	127	0	0	0	0	0	0	6	0	1	144
5:00 P	0	0	4	3	0	1	58	0	0	0	0	0	0	10	0	0	76
5:15 P	0	0	4	1	0	3	91	0	0	0	0	0	0	5	0	3	107
5:30 P	0	0	2	0	0	1	87	0	0	0	0	0	0	3	0	3	96
5:45 P	0	0	4	1	0	0	70	0	0	0	0	0	0	4	0	0	79
6:00 P	0	0	3	1	0	0	54	0	0	0	0	0	0	3	0	1	62
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	0	0	29	10	3	14	629	0	0	0	0	0	0	50	0	9	741
Peak Hour: 4:30 PM to 5:30 PM																	
Total	0	0	13	6	0	10	363	0	0	0	0	0	0	24	0	7	423
Approach	19				373				0				31				423
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.68				0.71				n/a				0.78				0.73



TSI17077TM\_07p



Prepared for:

**Transportation Solutions, Inc.**

**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Lake Dr & Costco HQ E2 Drwy

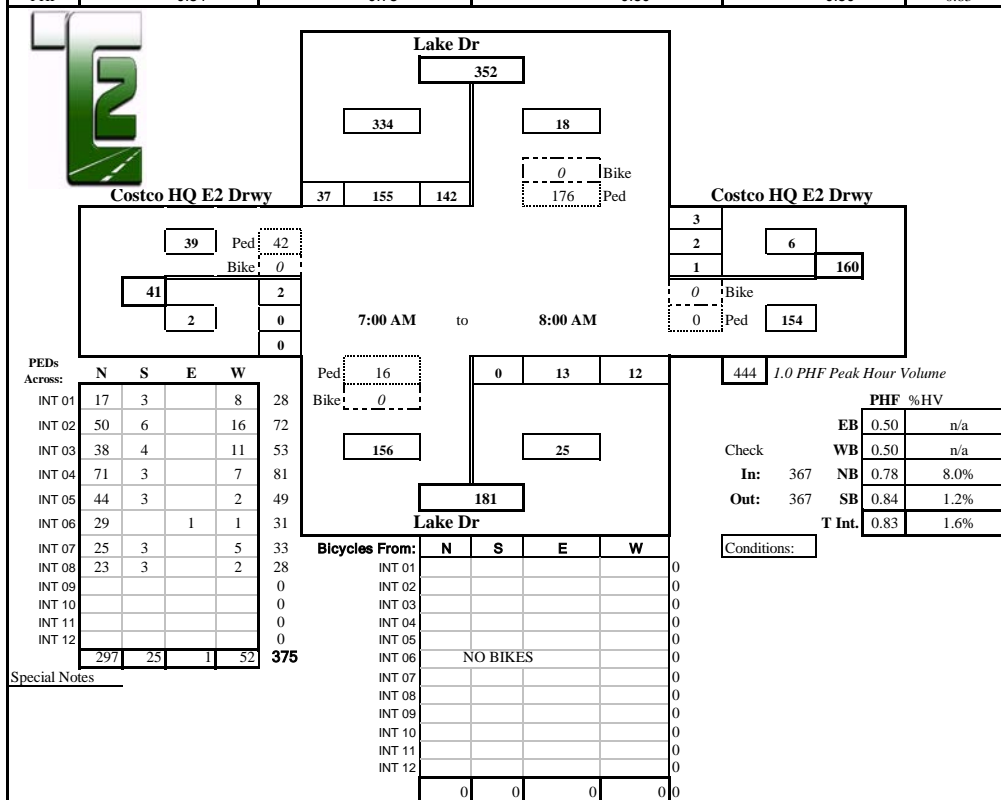
**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

**Checked By:** Jess

Time Interval Ending at	From North on (SB) Lake Dr				From South on (NB) Lake Dr				From East on (WB) Costco HQ E2 Drwy				From West on (EB) Costco HQ E2 Drwy				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	25	38	14	1	0	2	1	0	0	0	0	0	1	0	0	81
7:30 A	1	49	42	7	0	0	7	1	0	0	0	1	0	0	0	0	107
7:45 A	2	28	22	9	0	0	4	2	0	0	2	1	0	0	0	0	68
8:00 A	1	40	53	7	1	0	0	8	0	1	0	1	0	1	0	0	111
8:15 A	1	16	28	8	0	0	1	1	1	0	0	2	0	0	1	0	57
8:30 A	1	14	3	7	0	0	0	1	0	0	1	1	0	0	0	0	27
8:45 A	0	12	10	1	2	0	8	1	0	0	0	0	0	0	1	0	33
9:00 A	1	15	5	2	0	0	1	0	0	0	0	1	0	0	0	0	24
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	7	199	201	55	4	0	23	15	1	1	3	7	0	2	2	0	508
Peak Hour: 7:00 AM to 8:00 AM																	
Total	4	142	155	37	2	0	13	12	0	1	2	3	0	2	0	0	367
Approach	334				25				6				2				367
%HV	1.2%				8.0%				n/a				n/a				1.6%
PHF	0.84				0.78				0.50				0.50				0.83



TS117077TM\_08a



Prepared for: **Transportation Solutions, Inc.**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Lake Dr & Costco HQ E2 Drwy

Date of Count: Wed 7/12/2017

Location: Issaquah, Washington

Checked By: Jess

Time Interval Ending at	From North on (SB) Lake Dr				From South on (NB) Lake Dr				From East on (WB) Costco HQ E2 Drwy				From West on (EB) Costco HQ E2 Drwy				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	0	7	1	1	0	36	1	0	0	2	45	0	3	0	0	95
4:30 P	0	0	1	1	1	0	17	0	1	0	2	42	0	2	0	0	65
4:45 P	0	0	1	3	0	0	58	0	0	3	2	72	0	2	0	0	141
5:00 P	0	0	4	0	0	0	19	0	0	0	1	40	0	0	0	0	64
5:15 P	0	0	6	1	0	0	8	0	0	4	2	80	0	6	0	0	107
5:30 P	0	0	4	1	0	0	57	0	0	0	2	30	0	1	0	0	95
5:45 P	0	0	4	0	0	0	29	0	0	0	1	38	0	3	0	0	75
6:00 P	0	1	1	2	0	0	16	0	0	0	1	35	0	3	0	0	59
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

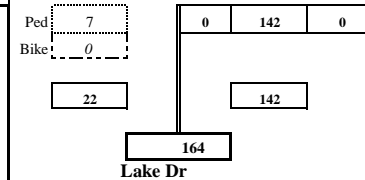
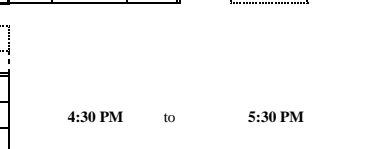
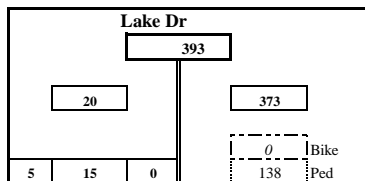
Total Survey	0	1	28	9	2	0	240	1	1	7	13	382	0	20	0	0	701
Peak Hour: 4:30 PM to 5:30 PM																	
Total	0	0	15	5	0	0	142	0	0	7	7	222	0	9	0	0	407
Approach	20				142				236				9				407
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.71				0.61				0.69				0.38				0.72



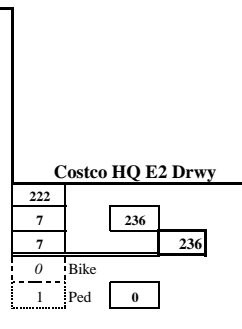
PEDs Across:

	N	S	E	W	
INT 01	25			4	29
INT 02	21	1		5	27
INT 03	39	6		6	51
INT 04	17	1	1	2	21
INT 05	65			3	68
INT 06	17			2	19
INT 07	18			1	19
INT 08	21	1		2	24
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	223	9	1	25	258

Special Notes



Bicycles From:	N	S	E	W
INT 01		1		
INT 02				
INT 03				
INT 04				
INT 05				
INT 06				
INT 07				
INT 08				
INT 09				
INT 10				
INT 11				
INT 12				
	0	1	0	



564 1.0 PHF Peak Hour Volume

Check	EB	WB	NB	SB	T Int.	PHF	%HV
In:	407	0.61	0.69	0.38	0.72	n/a	n/a
Out:	407	0.61	0.69	0.38	0.72	n/a	n/a

Conditions:



Prepared for:

**Transportation Solutions, Inc.**

**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Lake Dr & Costco HQ E3 Drwy

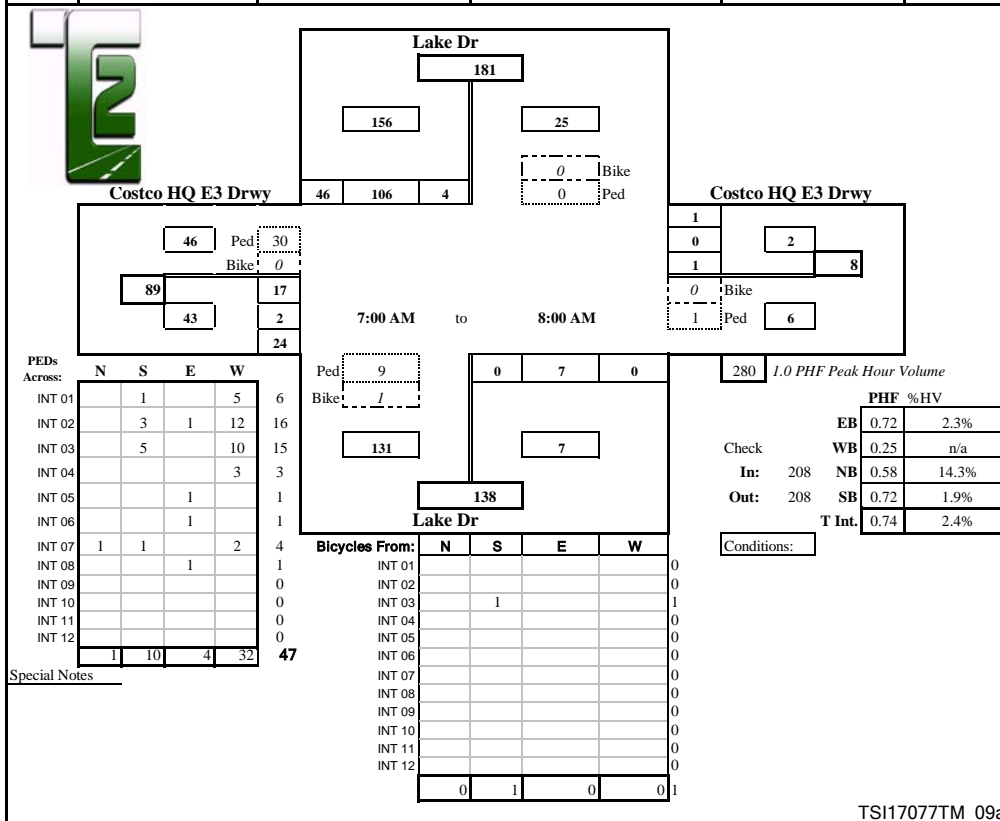
**Date of Count:** Wed 7/12/2017

**Location:** Issaquah, Washington

**Checked By:** Jess

Time Interval	From North on (SB) Lake Dr				From South on (NB) Lake Dr				From East on (WB) Costco HQ E3 Drwy				From West on (EB) Costco HQ E3 Drwy				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	22	16	0	0	1	0	0	0	0	0	1	2	1	2	44
7:30 A	1	0	30	12	0	0	3	0	0	1	0	1	0	4	0	5	56
7:45 A	1	1	11	10	0	0	2	0	0	0	0	0	0	4	1	9	38
8:00 A	1	3	43	8	1	0	1	0	0	0	0	0	0	7	0	8	70
8:15 A	0	0	25	3	0	0	1	0	0	0	0	0	0	1	0	1	31
8:30 A	0	0	2	1	0	0	0	0	0	0	0	0	0	2	0	1	6
8:45 A	0	1	6	4	0	0	5	0	0	0	0	0	2	4	0	0	20
9:00 A	0	0	4	1	0	0	1	0	0	0	0	0	0	0	0	1	7
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	3	5	143	55	1	0	14	0	0	1	0	1	3	24	2	27	272
Peak Hour: 7:00 AM to 8:00 AM																	
Total	3	4	106	46	1	0	7	0	0	1	0	1	1	17	2	24	208
Approach	156				7				2				43				208
%HV	1.9%				14.3%				n/a				2.3%				2.4%
PHF	0.72				0.58				0.25				0.72				0.74



TS117077TM\_09a



Prepared for: **Transportation Solutions, Inc.**  
**Traffic Count Consultants, Inc.**

Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

Intersection: Lake Dr & Costco HQ E3 Drwy

Date of Count: Wed 7/12/2017

Location: Issaquah, Washington

Checked By: Jess

Time Interval Ending at	From North on (SB) Lake Dr				From South on (NB) Lake Dr				From East on (WB) Costco HQ E3 Drwy				From West on (EB) Costco HQ E3 Drwy				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	0	1	2	4	1	0	12	0	0	0	0	0	0	25	1	0	45
4:30 P	0	1	0	0	1	1	3	0	0	0	0	1	0	13	0	0	19
4:45 P	0	0	1	3	0	4	48	1	0	1	1	0	0	10	0	0	69
5:00 P	0	0	1	3	0	0	5	0	0	0	1	1	0	13	0	0	24
5:15 P	0	0	2	8	0	0	3	0	0	0	1	0	0	5	0	0	19
5:30 P	0	0	1	3	0	2	41	0	0	0	0	3	0	13	0	0	63
5:45 P	0	0	3	1	0	1	13	0	0	0	0	1	0	15	0	0	34
6:00 P	0	0	0	1	0	1	3	0	0	0	0	0	0	13	0	0	18
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

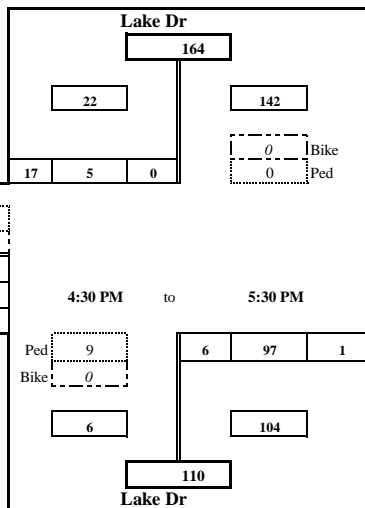
Total Survey	0	2	10	23	2	9	128	1	0	1	3	6	0	107	1	0	291
Peak Hour: 4:30 PM to 5:30 PM																	
Total	0	0	5	17	0	6	97	1	0	1	3	4	0	41	0	0	175
Approach	22				104				8				41				175
%HV	n/a				n/a				n/a				n/a				0.0%
PHF	0.55				0.49				0.67				0.79				0.63



PEDs  
Across:

	N	S	E	W	
INT 01		3	1	4	8
INT 02		5		3	8
INT 03		6		5	11
INT 04		2	3	1	6
INT 05				3	3
INT 06		1		2	3
INT 07		1		1	2
INT 08		2	1	1	4
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	20	5	20	45

Special Notes



Costco HQ E3 Drwy

4			
3		8	
1			9
0			
3			1

276 1.0 PHF Peak Hour Volume

PHF	%HV
EB	0.79 n/a
WB	0.67 n/a
NB	0.49 n/a
SB	0.55 n/a
T Int.	0.63 0.0%

Conditions:

Bicycles From:	N	S	E	W
INT 01				1
INT 02				0
INT 03				1
INT 04				0
INT 05				0
INT 06				0
INT 07				0
INT 08				0
INT 09				0
INT 10				0
INT 11				0
INT 12				0
	0	0	0	2

TS117077TM\_09p





Prepared for:

**Transportation Solutions, Inc.****Traffic Count Consultants, Inc.**

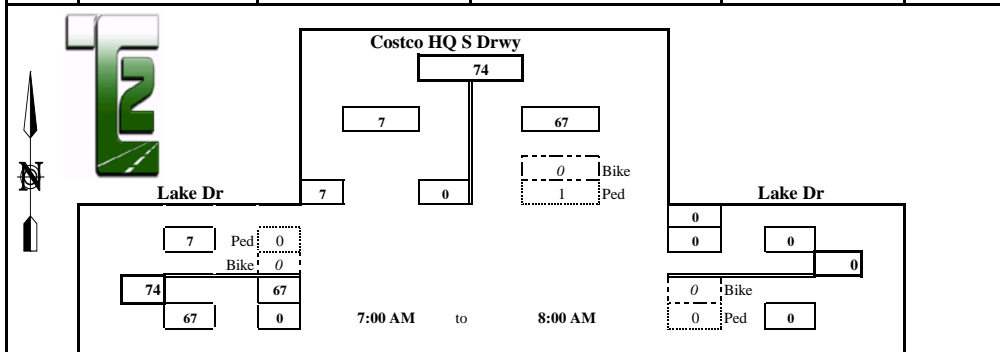
Phone: (253) 926-6009 FAX: (253) 922-7211 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** Costco HQ S Drwy & Lake Dr**Date of Count:** Wed 7/12/2017**Location:** Issaquah, Washington**Checked By:** Jess

Time Interval	From North on (SB) Costco HQ S Drwy				From South on (NB) 0				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
Ending at	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	0	0	0	2	0	0	0	0	0	0	0	0	0	15	0	0	17
7:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	20
7:45 A	1	0	0	4	0	0	0	0	0	0	0	0	0	16	0	0	20
8:00 A	1	0	0	1	0	0	0	0	0	0	0	0	0	16	0	0	17
8:15 A	0	0	0	1	0	0	0	0	0	0	0	0	0	6	0	0	7
8:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
8:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4
9:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	2	0	0	8	0	0	0	0	0	0	0	0	0	84	0	0	92
Peak Hour: 7:00 AM to 8:00 AM																	
Total	2	0	0	7	0	0	0	0	0	0	0	0	0	67	0	0	74
Approach	7				0				0				67				74
%HV	28.6%				n/a				n/a				n/a				2.7%
PHF	0.44				n/a				n/a				0.84				0.93



PEDs

Across:

	N	S	E	W	
INT 01					0
INT 02	1				1
INT 03					0
INT 04					0
INT 05					0
INT 06					0
INT 07	2				2
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	3	0	0	0	3

Special Notes

East leg of Lake Dr is closed.

Bicycles From:

	N	S	E	W	
INT 01					0
INT 02					0
INT 03					0
INT 04					0
INT 05					0
INT 06	NO BIKES				0
INT 07					0
INT 08					0
INT 09					0
INT 10					0
INT 11					0
INT 12					0
	0	0	0	0	0

80 1.0 PHF Peak Hour Volume

	PHF	%HV
EB	0.84	n/a
WB	n/a	n/a
Check In: 74 NB	n/a	n/a
Out: 74 SB	0.44	28.6%
T Int.	0.93	2.7%

Conditions:

TS117077TM\_11a





Prepared for: **Transportation Solutions, Inc.**  
**Traffic Count Consultants, Inc.**

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** 10th Ave NW & Lake Dr  
**Location:** Issaquah, Washington

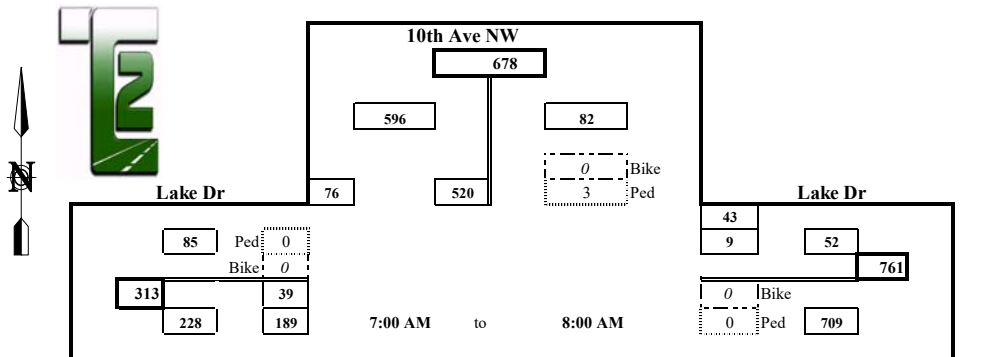
**Date of Count:** Tues 2/13/2018  
**Checked By:** Jess

Time Interval Ending at	From North on (SB) 10th Ave NW				From South on (NB) 0				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
7:15 A	1	108	0	9	0	0	0	0	5	0	2	12	2	2	31	0	164
7:30 A	3	151	0	16	0	0	0	0	4	0	2	13	1	10	39	0	231
7:45 A	2	137	0	21	0	0	0	0	2	0	3	10	0	13	51	0	235
8:00 A	3	124	0	30	0	0	0	0	3	0	2	8	0	14	68	0	246
8:15 A	4	85	0	17	0	0	0	0	2	0	2	10	0	5	28	0	147
8:30 A	3	60	0	11	0	0	0	0	2	0	1	7	1	4	16	0	99
8:45 A	3	43	0	8	0	0	0	0	2	0	3	6	0	4	15	0	79
9:00 A	4	43	0	10	0	0	0	0	5	0	0	8	0	7	10	0	78
9:15 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:30 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10:00 A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	23	751	0	122	0	0	0	0	25	0	15	74	4	59	258	0	1279
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Peak Hour: 7:00 AM to 8:00 AM

Total	9	520	0	76	0	0	0	0	14	0	9	43	3	39	189	0	876
Approach	596				0				52				228				876
%HV	1.5%				n/a				26.9%				1.3%				3.0%
PHF	0.89				n/a				0.87				0.70				0.89



PEDs Across:	N	S	E	W
INT 01				0
INT 02	3			3
INT 03				0
INT 04				0
INT 05	1			1
INT 06				0
INT 07				0
INT 08	1			1
INT 09				0
INT 10				0
INT 11				0
INT 12				0
	5	0	0	0

Bicycles From:	N	S	E	W
INT 01				0
INT 02				0
INT 03				0
INT 04				0
INT 05				0
INT 06	NO BIKES			
INT 07				0
INT 08				0
INT 09				0
INT 10				0
INT 11				0
INT 12				0
	0	0	0	0

984 1.0 PHF Peak Hour Volume			
PHF %HV			
EB	0.70	1.3%	
WB	0.87	26.9%	
In: 876	NB	n/a	n/a
Out: 876	SB	0.89	1.5%
T Int:	0.89	3.0%	

Conditions:

Special Notes



Prepared for: **Transportation Solutions, Inc.**  
**Traffic Count Consultants, Inc.**

Phone: (253) 770-1407 FAX: (253) 770-1411 E-Mail: Team@TC2inc.com

WBE/DBE

**Intersection:** 10th Ave NW & Lake Dr  
**Location:** Issaquah, Washington

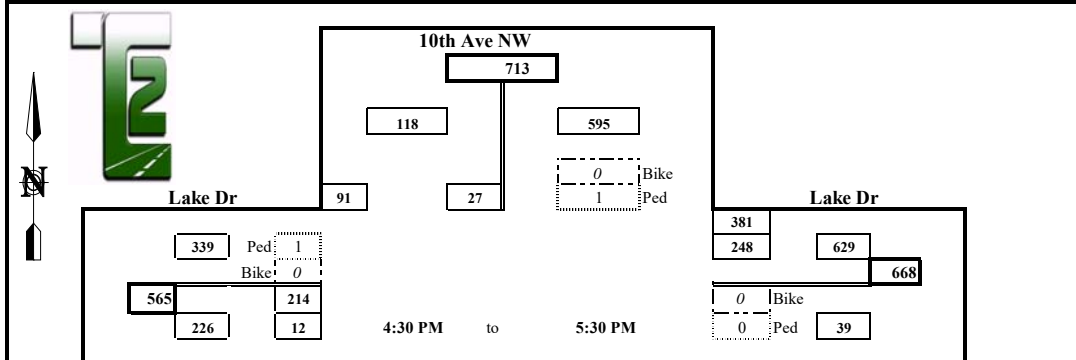
**Date of Count:** Tues 2/13/2018  
**Checked By:** Jess

Time Interval Ending at	From North on (SB) 10th Ave NW				From South on (NB) 0				From East on (WB) Lake Dr				From West on (EB) Lake Dr				Interval Total
	T	L	S	R	T	L	S	R	T	L	S	R	T	L	S	R	
4:15 P	4	7	0	13	0	0	0	0	2	0	53	98	0	48	3	0	222
4:30 P	2	6	0	30	0	0	0	0	7	0	32	58	0	32	2	0	160
4:45 P	2	6	0	31	0	0	0	0	2	0	74	134	2	57	5	0	307
5:00 P	5	7	0	27	0	0	0	0	2	0	45	51	0	32	3	0	165
5:15 P	2	9	0	18	0	0	0	0	3	0	76	137	0	61	3	0	304
5:30 P	1	5	0	15	0	0	0	0	1	0	53	59	0	64	1	0	197
5:45 P	2	4	0	21	0	0	0	0	1	0	45	72	0	65	0	0	207
6:00 P	1	1	0	14	0	0	0	0	1	0	29	42	2	63	2	0	151
6:15 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Total Survey	19	45	0	169	0	0	0	0	19	0	407	651	4	422	19	0	1713
--------------	----	----	---	-----	---	---	---	---	----	---	-----	-----	---	-----	----	---	------

Peak Hour: 4:30 PM to 5:30 PM

Total	10	27	0	91	0	0	0	0	8	0	248	381	2	214	12	0	973
Approach	118				0				629				226				973
%HV	8.5%				n/a				1.3%				0.9%				2.1%
PHF	0.80				n/a				0.74				0.87				0.79



PEDs Across:		N	S	E	W	
INT 01		3				3
INT 02		1				1
INT 03		3				3
INT 04		1				1
INT 05	1	2			1	4
INT 06						0
INT 07	1					1
INT 08					1	1
INT 09						0
INT 10						0
INT 11						0
INT 12						0
		2	10	0	2	14

Bicycles From:		N	S	E	W	
INT 01						0
INT 02	1					1
INT 03						0
INT 04						0
INT 05						0
INT 06						0
INT 07						0
INT 08						0
INT 09						0
INT 10						0
INT 11						0
INT 12						0
		1	0	0	0	1

Conditions:		
-------------	--	--







PHF %HV		
EB	0.87	0.9%
WB	0.74	1.3%
In: 973	NB	n/a n/a
Out: 973	SB	0.80 8.5%
T Int.		0.79 2.1%

Special Notes

**Existing LOS**



Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	128	14	4	43	53	3	10	2	166	51	13
Future Vol, veh/h	2	128	14	4	43	53	3	10	2	166	51	13
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Heavy Vehicles, %	1	1	1	7	7	7	20	20	20	5	5	5
Mvmt Flow	3	168	18	5	57	70	4	13	3	218	67	17
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	10.5	8.8	9	12
HCM LOS	B	A	A	B







Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	38%	0%	100%	0%	9%	0%	87%	0%
Vol Thru, %	62%	71%	0%	90%	91%	0%	13%	66%
Vol Right, %	0%	29%	0%	10%	0%	100%	0%	34%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	7	2	142	47	53	192	39
LT Vol	3	0	2	0	4	0	166	0
Through Vol	5	5	0	128	43	0	26	26
RT Vol	0	2	0	14	0	53	0	13
Lane Flow Rate	11	9	3	187	62	70	252	51
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.019	0.015	0.004	0.286	0.1	0.098	0.411	0.073
Departure Headway (Hd)	6.355	5.963	6.081	5.508	5.799	5.05	5.869	5.195
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	567	604	586	648	614	704	610	684
Service Time	4.055	3.663	3.849	3.275	3.573	2.824	3.644	2.97
HCM Lane V/C Ratio	0.019	0.015	0.005	0.289	0.101	0.099	0.413	0.075
HCM Control Delay	9.2	8.8	8.9	10.5	9.2	8.4	12.7	8.4
HCM Lane LOS	A	A	A	B	A	A	B	A
HCM 95th-tile Q	0.1	0	0	1.2	0.3	0.3	2	0.2

HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	251	43	18	85	1	14	2	11	1	0	1
Future Vol, veh/h	2	251	43	18	85	1	14	2	11	1	0	1
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	10	10	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	79	79	79	79	79	79	79	79	79	79	79	79
Heavy Vehicles, %	1	1	1	0	0	0	4	4	4	0	0	0
Mvmt Flow	3	318	54	23	108	1	18	3	14	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	110	0	0	372	0	0	505	505	355	523	532	110
Stage 1	-	-	-	-	-	-	350	350	-	155	155	-
Stage 2	-	-	-	-	-	-	155	155	-	368	377	-
Critical Hdwy	4.11	-	-	4.1	-	-	7.14	6.54	6.24	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.14	5.54	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.14	5.54	-	6.1	5.5	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	3.536	4.036	3.336	3.5	4	3.3
Pot Cap-1 Maneuver	1486	-	-	1198	-	-	474	467	684	468	456	949
Stage 1	-	-	-	-	-	-	662	629	-	852	773	-
Stage 2	-	-	-	-	-	-	843	766	-	656	619	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1485	-	-	1188	-	-	465	457	678	445	446	947
Mov Cap-2 Maneuver	-	-	-	-	-	-	465	457	-	445	446	-
Stage 1	-	-	-	-	-	-	661	628	-	850	757	-
Stage 2	-	-	-	-	-	-	825	751	-	633	618	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.4	12.2	11
HCM LOS			B	B








Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	532	1485	-	-	1188	-	-	605
HCM Lane V/C Ratio	0.064	0.002	-	-	0.019	-	-	0.004
HCM Control Delay (s)	12.2	7.4	-	-	8.1	-	-	11
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0

HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 1.8







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	184	77	47	96	2	0	0	16	11	0	7
Future Vol, veh/h	3	184	77	47	96	2	0	0	16	11	0	7
Conflicting Peds, #/hr	0	0	2	2	0	0	5	0	1	1	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	1	1	1	0	0	0	0	0	0	0	0	0
Mvmt Flow	4	245	103	63	128	3	0	0	21	15	0	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	131	0	0	350	0	0	-	-	300	561	-	134
Stage 1	-	-	-	-	-	-	-	-	-	255	-	-
Stage 2	-	-	-	-	-	-	-	-	-	306	-	-
Critical Hdwy	4.11	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.209	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	1460	-	-	1220	-	-	0	0	744	441	0	920
Stage 1	-	-	-	-	-	-	0	0	-	754	0	-
Stage 2	-	-	-	-	-	-	0	0	-	708	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1454	-	-	1219	-	-	-	-	742	410	-	916
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	410	-	-
Stage 1	-	-	-	-	-	-	-	-	-	752	-	-
Stage 2	-	-	-	-	-	-	-	-	-	685	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	2.6	10	12.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	742	1454	-	-	1219	-	-	410	916
HCM Lane V/C Ratio	0.029	0.003	-	-	0.051	-	-	0.036	0.01
HCM Control Delay (s)	10	7.5	-	-	8.1	-	-	14.1	9
HCM Lane LOS	B	A	-	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.2	-	-	0.1	0

Intersection	
Intersection Delay, s/veh	35.8
Intersection LOS	E

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	39	189	9	43	520	76
Future Vol, veh/h	39	189	9	43	520	76
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	1	1	4	4	0	0
Mvmt Flow	43	210	10	48	578	84
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	12.9	9.7	46.8
HCM LOS	B	A	E

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	39	189	9	43	520	76
LT Vol	39	0	0	0	520	0
Through Vol	0	189	9	0	0	0
RT Vol	0	0	0	43	0	76
Lane Flow Rate	43	210	10	48	578	84
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.085	0.385	0.02	0.084	0.964	0.113
Departure Headway (Hd)	7.103	6.594	7.05	6.333	6.007	4.802
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	504	546	507	565	607	747
Service Time	4.845	4.336	4.803	4.085	3.729	2.524
HCM Lane V/C Ratio	0.085	0.385	0.02	0.085	0.952	0.112
HCM Control Delay	10.5	13.4	9.9	9.7	52.4	8.1
HCM Lane LOS	B	B	A	A	F	A
HCM 95th-tile Q	0.3	1.8	0.1	0.3	13.4	0.4

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5

Timing Plan: AM

Intersection												
Int Delay, s/veh	4.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	5	5	2	1	0	1	5	41	3	389	340	21
Future Vol, veh/h	5	5	2	1	0	1	5	41	3	389	340	21
Conflicting Peds, #/hr	1	0	367	367	0	1	2	0	20	20	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	50	50	50	4	4	4	0	0	0
Mvmt Flow	5	5	2	1	0	1	5	45	3	423	370	23

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1288	1308	750	1674	1317	67	394	0	0	68	0	0
Stage 1	1229	1229	-	77	77	-	-	-	-	-	-	-
Stage 2	59	79	-	1597	1240	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.6	7	6.7	4.14	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.6	6	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.6	6	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.95	4.45	3.75	2.236	-	-	2.2	-	-
Pot Cap-1 Maneuver	142	161	415	58	127	877	1154	-	-	1546	-	-
Stage 1	220	252	-	825	746	-	-	-	-	-	-	-
Stage 2	958	833	-	103	200	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	111	114	288	30	90	862	801	-	-	1545	-	-
Mov Cap-2 Maneuver	111	114	-	30	90	-	-	-	-	-	-	-
Stage 1	218	183	-	806	729	-	-	-	-	-	-	-
Stage 2	950	814	-	50	145	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.1	69.5	1	4.3
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	801	-	-	125 58	1545	-	-
HCM Lane V/C Ratio	0.007	-	-	0.104 0.037	0.274	-	-
HCM Control Delay (s)	9.5	-	-	37.1 69.5	8.2	-	-
HCM Lane LOS	A	-	-	E F	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3 0.1	1.1	-	-







HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	8	0	16	333	10
Future Vol, veh/h	33	8	0	16	333	10
Conflicting Peds, #/hr	0	0	1	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	0	0	13	13	1	1
Mvmt Flow	38	9	0	18	378	11

Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	403	385	391
Stage 1	385	-	-
Stage 2	18	-	-
Critical Hdwy	6.4	6.2	4.23
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	2.317
Pot Cap-1 Maneuver	607	667	1110
Stage 1	692	-	-
Stage 2	1010	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	606	666	1110
Mov Cap-2 Maneuver	606	-	-
Stage 1	691	-	-
Stage 2	1009	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.3	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1110	-	617	-	-
HCM Lane V/C Ratio	-	-	0.076	-	-
HCM Control Delay (s)	0	-	11.3	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection

Int Delay, s/veh 3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕		↕	↕	
Traffic Vol, veh/h	2	0	0	1	2	3	0	13	12	145	158	38
Future Vol, veh/h	2	0	0	1	2	3	0	13	12	145	158	38
Conflicting Peds, #/hr	176	0	16	16	0	176	42	0	0	0	0	42
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	83	83	83	83	83	83	83	83	83
Heavy Vehicles, %	0	0	0	0	0	0	8	8	8	1	1	1
Mvmt Flow	2	0	0	1	2	4	0	16	14	175	190	46

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	807	635	271	602	651	199	278	0	0	30	0	0
Stage 1	605	605	-	23	23	-	-	-	-	-	-	-
Stage 2	202	30	-	579	628	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.18	-	-	4.11	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.272	-	-	2.209	-	-
Pot Cap-1 Maneuver	302	399	773	414	390	847	1251	-	-	1589	-	-
Stage 1	488	491	-	1000	880	-	-	-	-	-	-	-
Stage 2	805	874	-	504	479	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	222	335	736	368	328	723	1234	-	-	1356	-	-
Mov Cap-2 Maneuver	222	335	-	368	328	-	-	-	-	-	-	-
Stage 1	471	413	-	1000	880	-	-	-	-	-	-	-
Stage 2	682	874	-	433	403	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	21.4	12.9	0	3.4
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1234	-	-	222 368 488	1356	-	-
HCM Lane V/C Ratio	-	-	-	0.011 0.003 0.012	0.129	-	-
HCM Control Delay (s)	0	-	-	21.4 14.8 12.5	8	-	-
HCM Lane LOS	A	-	-	C B B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0 0 0	0.4	-	-

HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Buliding Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	17	2	25	1	0	1	0	7	0	4	108	47
Future Vol, veh/h	17	2	25	1	0	1	0	7	0	4	108	47
Conflicting Peds, #/hr	0	0	9	9	0	0	30	0	1	1	0	30
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	74	74	74	74	74	74	74	74	74	74	74	74
Heavy Vehicles, %	2	2	2	0	0	0	14	14	14	2	2	2
Mvmt Flow	23	3	34	1	0	1	0	9	0	5	146	64




Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	229	229	217	226	260	10	239	0	0	10	0	0
Stage 1	219	219	-	10	10	-	-	-	-	-	-	-
Stage 2	10	10	-	216	250	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.1	6.5	6.2	4.24	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.5	4	3.3	2.326	-	-	2.218	-	-
Pot Cap-1 Maneuver	726	671	823	734	648	1077	1261	-	-	1610	-	-
Stage 1	783	722	-	1016	891	-	-	-	-	-	-	-
Stage 2	1011	887	-	791	704	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	705	652	796	693	629	1076	1252	-	-	1610	-	-
Mov Cap-2 Maneuver	705	652	-	693	629	-	-	-	-	-	-	-
Stage 1	763	702	-	1015	890	-	-	-	-	-	-	-
Stage 2	1010	886	-	747	684	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	10.2			9.3			0			0.2		
HCM LOS	B			A								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1252	-	-	751 843	1610	-	-
HCM Lane V/C Ratio	-	-	-	0.079 0.003	0.003	-	-
HCM Control Delay (s)	0	-	-	10.2 9.3	7.2	-	-
HCM Lane LOS	A	-	-	B A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3 0	0	-	-

Intersection

Int Delay, s/veh 2.8








Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	68	0	0	134	0	7
Future Vol, veh/h	68	0	0	134	0	7
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	93	93	93	93	93	93
Heavy Vehicles, %	0	0	0	0	29	29
Mvmt Flow	73	0	0	144	0	8

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	145	0	0 219 73
Stage 1	-	-	- 73 -
Stage 2	-	-	- 146 -
Critical Hdwy	4.1	-	- 6.69 6.49
Critical Hdwy Stg 1	-	-	- 5.69 -
Critical Hdwy Stg 2	-	-	- 5.69 -
Follow-up Hdwy	2.2	-	- 3.761 3.561
Pot Cap-1 Maneuver	1450	-	- 713 919
Stage 1	-	-	- 886 -
Stage 2	-	-	- 819 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1450	-	- 676 918
Mov Cap-2 Maneuver	-	-	- 676 -
Stage 1	-	-	- 885 -
Stage 2	-	-	- 777 -

Approach	EB	WB	SB
HCM Control Delay, s	7.6	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1450	-	-	-	918
HCM Lane V/C Ratio	0.05	-	-	-	0.008
HCM Control Delay (s)	7.6	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0

Intersection	
Intersection Delay, s/veh	14.3
Intersection LOS	B







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	132	17	15	190	402	20	149	23	61	45	20
Future Vol, veh/h	36	132	17	15	190	402	20	149	23	61	45	20
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	40	148	19	17	213	452	22	167	26	69	51	22
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	11.9	16.5	11.6	11.6
HCM LOS	B	C	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	21%	0%	100%	0%	7%	0%	73%	0%
Vol Thru, %	79%	76%	0%	89%	93%	0%	27%	53%
Vol Right, %	0%	24%	0%	11%	0%	100%	0%	47%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	95	98	36	149	205	402	84	43
LT Vol	20	0	36	0	15	0	61	0
Through Vol	75	75	0	132	190	0	23	23
RT Vol	0	23	0	17	0	402	0	20
Lane Flow Rate	106	110	40	167	230	452	94	48
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.21	0.21	0.08	0.305	0.389	0.671	0.196	0.092
Departure Headway (Hd)	7.119	6.894	7.132	6.559	6.076	5.347	7.531	6.908
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	502	518	500	544	590	673	474	516
Service Time	4.896	4.672	4.913	4.339	3.837	3.108	5.315	4.692
HCM Lane V/C Ratio	0.211	0.212	0.08	0.307	0.39	0.672	0.198	0.093
HCM Control Delay	11.8	11.5	10.5	12.2	12.7	18.4	12.2	10.4
HCM Lane LOS	B	B	B	B	B	C	B	B
HCM 95th-tile Q	0.8	0.8	0.3	1.3	1.8	5.1	0.7	0.3

HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	5.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	53	132	32	19	456	5	96	7	15	15	1	55
Future Vol, veh/h	53	132	32	19	456	5	96	7	15	15	1	55
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	57	142	34	20	490	5	103	8	16	16	1	59

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	499	0	0	187	0	0	848	824	170	822	838	496
Stage 1	-	-	-	-	-	-	284	284	-	537	537	-
Stage 2	-	-	-	-	-	-	564	540	-	285	301	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1075	-	-	1399	-	-	284	307	879	295	305	578
Stage 1	-	-	-	-	-	-	727	675	-	532	526	-
Stage 2	-	-	-	-	-	-	514	520	-	727	669	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1075	-	-	1399	-	-	239	283	871	269	281	577
Mov Cap-2 Maneuver	-	-	-	-	-	-	239	283	-	269	281	-
Stage 1	-	-	-	-	-	-	682	633	-	503	517	-
Stage 2	-	-	-	-	-	-	454	511	-	668	628	-








Approach	EB	WB	NB	SB
HCM Control Delay, s	2.1	0.3	30.3	14.4
HCM LOS			D	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	266	1075	-	-	1399	-	-	459
HCM Lane V/C Ratio	0.477	0.053	-	-	0.015	-	-	0.166
HCM Control Delay (s)	30.3	8.5	-	-	7.6	-	-	14.4
HCM Lane LOS	D	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	2.4	0.2	-	-	0	-	-	0.6



HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	3.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	125	10	29	368	45	0	0	41	50	0	112
Future Vol, veh/h	28	125	10	29	368	45	0	0	41	50	0	112
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	29	132	11	31	387	47	0	0	43	53	0	118







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	437	0	0	143	0	0	-	-	138	670	-	439
Stage 1	-	-	-	-	-	-	-	-	-	474	-	-
Stage 2	-	-	-	-	-	-	-	-	-	196	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	1134	-	-	1452	-	-	0	0	916	373	0	622
Stage 1	-	-	-	-	-	-	0	0	-	575	0	-
Stage 2	-	-	-	-	-	-	0	0	-	810	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1109	-	-	1452	-	-	-	-	915	342	-	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	342	-	-
Stage 1	-	-	-	-	-	-	-	-	-	559	-	-
Stage 2	-	-	-	-	-	-	-	-	-	752	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.5	9.1	13.9
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	915	1109	-	-	1452	-	-	342	608
HCM Lane V/C Ratio	0.047	0.027	-	-	0.021	-	-	0.154	0.194
HCM Control Delay (s)	9.1	8.3	-	-	7.5	-	-	17.4	12.3
HCM Lane LOS	A	A	-	-	A	-	-	C	B
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0.1	-	-	0.5	0.7

Intersection

Intersection Delay, s/veh	12
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	214	12	248	381	27	91
Future Vol, veh/h	214	12	248	381	27	91
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	243	14	282	433	31	103
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	13	12	9.9
HCM LOS	B	B	A

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	214	12	248	381	27	91
LT Vol	214	0	0	0	27	0
Through Vol	0	12	248	0	0	0
RT Vol	0	0	0	381	0	91
Lane Flow Rate	243	14	282	433	31	103
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.416	0.021	0.405	0.537	0.061	0.17
Departure Headway (Hd)	6.161	5.656	5.169	4.464	7.138	5.922
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	589	637	690	801	504	608
Service Time	3.861	3.356	2.946	2.24	4.847	3.631
HCM Lane V/C Ratio	0.413	0.022	0.409	0.541	0.062	0.169
HCM Control Delay	13.2	8.5	11.5	12.4	10.3	9.8
HCM Lane LOS	B	A	B	B	B	A
HCM 95th-tile Q	2	0.1	2	3.2	0.2	0.6

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5

Timing Plan: PM

Intersection												
Int Delay, s/veh	6.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	50	1	2	1	9	179	11	383	0	3	16	16
Future Vol, veh/h	50	1	2	1	9	179	11	383	0	3	16	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	63	1	3	1	11	224	14	479	0	4	20	20






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	662	544	30	545	554	479	40	0	-	479	0	0
Stage 1	38	38	-	506	506	-	-	-	-	-	-	-
Stage 2	624	506	-	39	48	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	378	449	1050	452	443	591	1583	-	0	1094	-	-
Stage 1	982	867	-	552	543	-	-	-	0	-	-	-
Stage 2	477	543	-	981	859	-	-	-	0	-	-	-
Platoon blocked, %								-			-	-
Mov Cap-1 Maneuver	228	443	1050	446	437	591	1583	-	-	1094	-	-
Mov Cap-2 Maneuver	228	443	-	446	437	-	-	-	-	-	-	-
Stage 1	973	864	-	547	538	-	-	-	-	-	-	-
Stage 2	288	538	-	974	856	-	-	-	-	-	-	-








Approach	EB	WB	NB	SB
HCM Control Delay, s	26	15.4	0.2	0.7
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1583	-	237 580	1094	-	-
HCM Lane V/C Ratio	0.009	-	0.28 0.407	0.003	-	-
HCM Control Delay (s)	7.3	-	26 15.4	8.3	-	-
HCM Lane LOS	A	-	D C	A	-	-
HCM 95th %tile Q(veh)	0	-	1.1 2	0	-	-

HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway







Costco Buildings 4 and 5  
Timing Plan: PM

Intersection						
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	7	10	370	13	6
Future Vol, veh/h	24	7	10	370	13	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	73	73	73	73	73	73
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	33	10	14	507	18	8
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	556	22	26	0	-	0
Stage 1	22	-	-	-	-	-
Stage 2	534	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	496	1061	1601	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	592	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	492	1061	1601	-	-	-
Mov Cap-2 Maneuver	492	-	-	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	587	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1601	-	560	-	-	
HCM Lane V/C Ratio	0.009	-	0.076	-	-	
HCM Control Delay (s)	7.3	-	12	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	




Intersection												
Int Delay, s/veh	7.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	0	0	7	7	226	0	145	0	0	15	5
Future Vol, veh/h	9	0	0	7	7	226	0	145	0	0	15	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	13	0	0	10	10	314	0	201	0	0	21	7
Major/Minor	Minor2		Minor1			Major1			Major2			
Conflicting Flow All	387	225	24	225	229	201	28	0	0	201	0	0
Stage 1	24	24	-	201	201	-	-	-	-	-	-	-
Stage 2	363	201	-	24	28	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	575	678	1058	735	674	845	1599	-	-	1383	-	-
Stage 1	999	879	-	805	739	-	-	-	-	-	-	-
Stage 2	660	739	-	999	876	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	357	678	1058	735	674	845	1599	-	-	1383	-	-
Mov Cap-2 Maneuver	357	678	-	735	674	-	-	-	-	-	-	-
Stage 1	999	879	-	805	739	-	-	-	-	-	-	-
Stage 2	409	739	-	999	876	-	-	-	-	-	-	-
Approach	EB		WB			NB			SB			
HCM Control Delay, s	15.5		11.9			0			0			
HCM LOS	C		B									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1WBLn2	SBL	SBT	SBR					
Capacity (veh/h)	1599	-	-	357 735 839	1383	-	-					
HCM Lane V/C Ratio	-	-	-	0.035 0.013 0.386	-	-	-					
HCM Control Delay (s)	0	-	-	15.5 10 12	0	-	-					
HCM Lane LOS	A	-	-	C B B	A	-	-					
HCM 95th %tile Q(veh)	0	-	-	0.1 0 1.8	0	-	-					

HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Buliding Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	42	0	0	1	3	4	6	99	1	0	5	17
Future Vol, veh/h	42	0	0	1	3	4	6	99	1	0	5	17
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	63	63	63	63	63	63	63	63	63	63	63	63
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	67	0	0	2	5	6	10	157	2	0	8	27
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	204	199	21	198	212	158	35	0	0	159	0	0
Stage 1	21	21	-	177	177	-	-	-	-	-	-	-
Stage 2	183	178	-	21	35	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	758	700	1062	765	689	893	1589	-	-	1433	-	-
Stage 1	1003	882	-	829	756	-	-	-	-	-	-	-
Stage 2	823	756	-	1003	870	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	745	696	1062	761	685	893	1589	-	-	1433	-	-
Mov Cap-2 Maneuver	745	696	-	761	685	-	-	-	-	-	-	-
Stage 1	997	882	-	824	751	-	-	-	-	-	-	-
Stage 2	807	751	-	1003	870	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	10.3		9.7		0.4		0					
HCM LOS	B		A									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1589	-	-	745	786	1433	-	-				
HCM Lane V/C Ratio	0.006	-	-	0.089	0.016	-	-	-				
HCM Control Delay (s)	7.3	-	-	10.3	9.7	0	-	-				
HCM Lane LOS	A	-	-	B	A	A	-	-				
HCM 95th %tile Q(veh)	0	-	-	0.3	0	0	-	-				



Intersection						
Int Delay, s/veh	8.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	6	0	0	0	0	71
Future Vol, veh/h	6	0	0	0	0	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	70	70	70	70	70	70
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	0	0	0	0	101
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	1	0	-	0	18	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	17	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1635	-	-	-	1005	1090
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	1011	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1635	-	-	-	999	1090
Mov Cap-2 Maneuver	-	-	-	-	999	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	1005	-
Approach	EB	WB		SB		
HCM Control Delay, s	7.2	0		8.6		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1635	-	-	-	-	1090
HCM Lane V/C Ratio	0.005	-	-	-	-	0.093
HCM Control Delay (s)	7.2	0	-	-	-	8.6
HCM Lane LOS	A	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-	0.3

**2026 Without-Development LOS**

Intersection

Intersection Delay, s/veh	10.1
Intersection LOS	B







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↱	↱		↰↱			↰↱	
Traffic Vol, veh/h	2	144	14	4	70	86	3	10	2	176	51	13
Future Vol, veh/h	2	144	14	4	70	86	3	10	2	176	51	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	2	157	15	4	76	93	3	11	2	191	55	14
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	10.1	8.6	8.6	11.2
HCM LOS	B	A	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	38%	0%	100%	0%	5%	0%	87%	0%
Vol Thru, %	62%	71%	0%	91%	95%	0%	13%	66%
Vol Right, %	0%	29%	0%	9%	0%	100%	0%	34%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	7	2	158	74	86	202	39
LT Vol	3	0	2	0	4	0	176	0
Through Vol	5	5	0	144	70	0	26	26
RT Vol	0	2	0	14	0	86	0	13
Lane Flow Rate	9	8	2	172	80	93	219	42
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.014	0.012	0.004	0.258	0.123	0.124	0.354	0.061
Departure Headway (Hd)	5.89	5.55	5.967	5.418	5.502	4.787	5.818	5.226
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	602	638	597	659	648	744	615	681
Service Time	3.684	3.344	3.728	3.179	3.265	2.549	3.585	2.993
HCM Lane V/C Ratio	0.015	0.013	0.003	0.261	0.123	0.125	0.356	0.062
HCM Control Delay	8.8	8.4	8.8	10.1	9	8.2	11.8	8.3
HCM Lane LOS	A	A	A	B	A	A	B	A
HCM 95th-tile Q	0	0	0	1	0.4	0.4	1.6	0.2

HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	277	43	18	146	1	14	2	11	1	0	1
Future Vol, veh/h	2	277	43	18	146	1	14	2	11	1	0	1
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	2	298	46	19	157	1	15	2	12	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	161	0	0	355	0	0	533	536	332	531	558	161
Stage 1	-	-	-	-	-	-	336	336	-	199	199	-
Stage 2	-	-	-	-	-	-	197	200	-	332	359	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1430	-	-	1215	-	-	461	450	714	462	441	889
Stage 1	-	-	-	-	-	-	682	640	-	807	740	-
Stage 2	-	-	-	-	-	-	809	734	-	686	631	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1430	-	-	1215	-	-	450	437	707	446	428	887
Mov Cap-2 Maneuver	-	-	-	-	-	-	450	437	-	446	428	-
Stage 1	-	-	-	-	-	-	675	633	-	804	727	-
Stage 2	-	-	-	-	-	-	795	721	-	671	624	-








Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	12.2	11.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	527	1430	-	-	1215	-	-	594
HCM Lane V/C Ratio	0.055	0.002	-	-	0.016	-	-	0.004
HCM Control Delay (s)	12.2	7.5	-	-	8	-	-	11.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0







HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5

Timing Plan: AM

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	210	77	47	157	2	0	0	16	11	0	7
Future Vol, veh/h	3	210	77	47	157	2	0	0	16	11	0	7
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	3	221	81	49	165	2	0	0	17	12	0	7
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	169	0	0	303	0	0	-	-	263	535	-	194
Stage 1	-	-	-	-	-	-	-	-	-	267	-	-
Stage 2	-	-	-	-	-	-	-	-	-	268	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	1421	-	-	1269	-	-	0	0	781	459	0	853
Stage 1	-	-	-	-	-	-	0	0	-	743	0	-
Stage 2	-	-	-	-	-	-	0	0	-	742	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1390	-	-	1269	-	-	-	-	780	434	-	833
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	434	-	-
Stage 1	-	-	-	-	-	-	-	-	-	740	-	-
Stage 2	-	-	-	-	-	-	-	-	-	724	-	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			1.8			9.7			11.9		
HCM LOS							A			B		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2			
Capacity (veh/h)	780	1390	-	-	1269	-	-	434	833			
HCM Lane V/C Ratio	0.022	0.002	-	-	0.039	-	-	0.027	0.009			
HCM Control Delay (s)	9.7	7.6	-	-	8	-	-	13.5	9.4			
HCM Lane LOS	A	A	-	-	A	-	-	B	A			
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1	0			

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	195	10	44	131	76
Future Vol, veh/h	59	195	10	44	131	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	64	212	11	48	142	83
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.8	7.8	9.4
HCM LOS	A	A	A

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	59	195	10	44	131	76
LT Vol	59	0	0	0	131	0
Through Vol	0	195	10	0	0	0
RT Vol	0	0	0	44	0	76
Lane Flow Rate	64	212	11	48	142	83
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.101	0.304	0.016	0.062	0.231	0.106
Departure Headway (Hd)	5.66	5.157	5.394	4.688	5.829	4.625
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	633	697	661	761	615	773
Service Time	3.397	2.894	3.144	2.437	3.568	2.364
HCM Lane V/C Ratio	0.101	0.304	0.017	0.063	0.231	0.107
HCM Control Delay	9	10.1	8.2	7.7	10.3	7.9
HCM Lane LOS	A	B	A	A	B	A
HCM 95th-tile Q	0.3	1.3	0	0.2	0.9	0.4



HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection												
Int Delay, s/veh	3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	5	5	2	1	0	1	17	43	205	187	171	9
Future Vol, veh/h	5	5	2	1	0	1	17	43	205	187	171	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	5	2	1	0	1	18	47	223	203	186	10






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	793	904	191	796	797	158	196	0	0	270	0	0
Stage 1	597	597	-	195	195	-	-	-	-	-	-	-
Stage 2	196	307	-	601	602	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	309	279	856	307	322	893	1389	-	-	1305	-	-
Stage 1	493	495	-	811	743	-	-	-	-	-	-	-
Stage 2	810	665	-	491	492	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	269	233	856	262	268	893	1389	-	-	1305	-	-
Mov Cap-2 Maneuver	269	233	-	262	268	-	-	-	-	-	-	-
Stage 1	487	418	-	800	733	-	-	-	-	-	-	-
Stage 2	799	656	-	408	415	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	18.3		13.9		0.5		4.2	
HCM LOS	C		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1389	-	-	283 405	1305	-	-
HCM Lane V/C Ratio	0.013	-	-	0.046 0.005	0.156	-	-
HCM Control Delay (s)	7.6	-	-	18.3 13.9	8.3	-	-
HCM Lane LOS	A	-	-	C B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1 0	0.6	-	-






HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	8	5	230	169	5
Future Vol, veh/h	33	8	5	230	169	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	36	9	5	250	184	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	447	186	189	0	-	0
Stage 1	186	-	-	-	-	-
Stage 2	261	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	573	861	1397	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	787	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	571	861	1397	-	-	-
Mov Cap-2 Maneuver	571	-	-	-	-	-
Stage 1	851	-	-	-	-	-
Stage 2	784	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	11.4	0.2		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1397	-	611	-	-	
HCM Lane V/C Ratio	0.004	-	0.073	-	-	
HCM Control Delay (s)	7.6	-	11.4	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.2	-	-	

HCM 2010 TWSC  
7: Lake Drive & Garage/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection						
Int Delay, s/veh	1.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	4	231	91	73	102
Future Vol, veh/h	1	4	231	91	73	102
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	4	251	99	79	111
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	571	301	0	0	350	0
Stage 1	301	-	-	-	-	-
Stage 2	270	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	486	743	-	-	1220	-
Stage 1	755	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	455	743	-	-	1220	-
Mov Cap-2 Maneuver	455	-	-	-	-	-
Stage 1	755	-	-	-	-	-
Stage 2	729	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.5	0	3.4			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 455 743 1220	-	-		
HCM Lane V/C Ratio	-	- 0.002 0.006 0.065	-	-		
HCM Control Delay (s)	-	- 12.9 9.9 8.2	-	-		
HCM Lane LOS	-	- B A A	-	-		
HCM 95th %tile Q(veh)	-	- 0 0 0.2	-	-		








HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Costco Buildings 4 and 5

Timing Plan: AM

Intersection

Int Delay, s/veh 2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	2	30	1	0	2	101	303	9	6	54	42
Future Vol, veh/h	19	2	30	1	0	2	101	303	9	6	54	42
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	21	2	33	1	0	2	110	329	10	7	59	46

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	650	654	82	666	671	334	104	0	0	339	0	0
Stage 1	95	95	-	554	554	-	-	-	-	-	-	-
Stage 2	555	559	-	112	117	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	385	389	983	376	380	712	1500	-	-	1231	-	-
Stage 1	917	820	-	520	517	-	-	-	-	-	-	-
Stage 2	520	514	-	898	803	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	361	358	983	340	350	712	1500	-	-	1231	-	-
Mov Cap-2 Maneuver	361	358	-	340	350	-	-	-	-	-	-	-
Stage 1	850	815	-	482	479	-	-	-	-	-	-	-
Stage 2	480	476	-	861	798	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.6		11.9		1.9		0.5	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1500	-	-	361	886	522	1231	-	-
HCM Lane V/C Ratio	0.073	-	-	0.057	0.039	0.006	0.005	-	-
HCM Control Delay (s)	7.6	-	-	15.6	9.2	11.9	7.9	-	-
HCM Lane LOS	A	-	-	C	A	B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.2	0.1	0	0	-	-

# MOVEMENT SUMMARY

 **Site: [9. 62nd & Lake - 2026 AM No Build]**

Costco Buildings 4 and 5  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: SE 62nd St											
6	T1	136	2.0	0.399	3.8	LOS A	2.4	60.9	0.02	0.44	38.1
16	R2	441	2.0	0.399	3.9	LOS A	2.4	60.9	0.02	0.44	36.9
Approach		577	2.0	0.399	3.9	LOS A	2.4	60.9	0.02	0.44	37.2
North: Lake Dr											
7	L2	7	2.0	0.071	10.2	LOS B	0.3	7.5	0.24	0.49	37.3
14	R2	87	2.0	0.071	4.3	LOS A	0.3	7.5	0.24	0.49	36.0
Approach		93	2.0	0.071	4.8	LOS A	0.3	7.5	0.24	0.49	36.1
West: Lake Dr											
5	L2	1	2.0	0.005	9.8	LOS A	0.0	0.6	0.04	0.42	37.7
2	T1	7	2.0	0.005	3.8	LOS A	0.0	0.6	0.04	0.42	37.6
Approach		8	2.0	0.005	4.7	LOS A	0.0	0.6	0.04	0.42	37.6
All Vehicles		678	2.0	0.399	4.0	LOS A	2.4	60.9	0.05	0.44	37.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22 Comment Response  
2026 62nd & Lake RAB.sip7

DETAILED OUTPUT

 Site: [9. 62nd & Lake - 2026 AM No Build]

Costco Buildings 4 and 5  
Roundabout

OUTPUT TABLE LINKS

-  Roundabouts
  - Roundabout Basic Parameters
  - Roundabout Circulating / Exiting Stream Parameters
  - Roundabout Gap Acceptance Parameters
  - Roundabout Flow Rates
-  Movements
  - Intersection Negotiation and Travel Data
  - Movement Capacity and Performance Parameters
  - Fuel Consumption, Emissions and Cost
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Roundabouts

Roundabout Basic Parameters  
Site: 9. 62nd & Lake - 2026 AM No Build

Site ID: Roundabout												
Central Island Diam ft	Circ Width ft	Insc Diam. ft	Entry Radius ft	Entry Angle deg	Circ Lanes	Entry Lanes	Av.Entry Lane Width ft	Appr Dist ft	Prop Upstr	Queued Signal	Extra Bunching %	
East: SE 62nd St												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
North: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
West: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
Roundabout Capacity Model: SIDRA Standard												
NA Not Applicable (single Site analysis or unconnected Site in Network analysis).												
N Program option resulted in zero value (single Site analysis or unconnected Site in Network analysis).												

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Roundabout Circulating / Exiting Stream Parameters  
Site: 9. 62nd & Lake - 2026 AM No Build



Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	Opng Flow veh/h	HVE pcu/veh	Adj. Flow pcu/h	%Near Lane Only	%Exit Flow Incl.	Cap. Const. Effect	O-D Factor	Aver Speed mph	In-Bunch Headway sec	Prop. Bunched
East: SE 62nd St													
W	T1	1	Dominant	1	1.02	1	0.0	0.0	N	1.000	15.6	2.00	0.001
N	R2	1	Dominant	1	1.02	1	0.0	0.0	N	1.000	15.6	2.00	0.001
North: Lake Dr													
E	L2	1	Dominant	136	1.02	139	0.0	0.0	N	0.999	24.6	2.00	0.155
W	R2	1	Dominant	136	1.02	139	0.0	0.0	N	0.999	24.6	2.00	0.155
West: Lake Dr													
N	L2	1	Dominant	7	1.02	7	0.0	0.0	N	0.999	15.6	2.00	0.008
E	T1	1	Dominant	7	1.02	7	0.0	0.0	N	0.999	15.6	2.00	0.008
Roundabout Capacity Model: SIDRA Standard													

[Go to Table Links \(Top\)](#)

### Roundabout Gap Acceptance Parameters

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	In-Bunch Headway sec	Prop. Bunched	Priority Sharing	HVE for Entry	Critical Gap		Follow-up Headway sec
								Headway sec	Dist ft	
East: SE 62nd St										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
W	T1	1	Dominant	2.00	0.001	Y	1.02	4.39	100.1	2.49
N	R2	1	Dominant	2.00	0.001	Y	1.02	4.39	100.1	2.49
North: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
E	L2	1	Dominant	2.00	0.155	Y	1.02	4.17	150.7	2.43
W	R2	1	Dominant	2.00	0.155	Y	1.02	4.17	150.7	2.43
West: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
N	L2	1	Dominant	2.00	0.008	Y	1.02	4.38	99.9	2.48
E	T1	1	Dominant	2.00	0.008	Y	1.02	4.38	99.9	2.48

Roundabout Capacity Model: SIDRA Standard

Priority sharing means Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

[Go to Table Links \(Top\)](#)

### Roundabout Flow Rates

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### CIRCULATING LANE FLOW RATES

Lane No.	Circulating Flow Rate veh/h	pcu/h	Percent
East: SE 62nd St			
1	1	1	100.0%

Total	1	1	
-----			
North: Lake Dr			
1	136	139	100.0%
Total	136	139	
-----			
West: Lake Dr			
1	7	7	100.0%
Total	7	7	
-----			
The SIDRA Standard roundabout capacity model option is in use. This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.			
APPROACH LANE FLOW RATES			
-----			
Lane	Approach Flows (veh/h)		
No.	Out	To Downst	Total
-----			
East: SE 62nd St			
1	441	136	577
Total	441	136	577
-----			
North: Lake Dr			
1	87	6	93
Total	87	6	93
-----			
West: Lake Dr			
1	7	1	8
Total	7	1	8
-----			

[Go to Table Links \(Top\)](#)

## Movements

### Intersection Negotiation and Travel Data Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### TRAVEL SPEED, TRAVEL DISTANCE AND TRAVEL TIME

From Approach	To Exit	Turn	Running Speed mph	Travel Speed mph	Travel Distance ft	Travel Time s	Total Dem Flows veh-mi/h	Travel Arv Flows veh-mi/h	Tot.Trav. Time veh-h/h
-----									
East: SE 62nd St									
	West	T1	38.1	38.1	3273.0#	58.6#	84.2	84.2	2.2
	North	R2	36.9	36.9	3273.0#	60.5#	273.6	273.6	7.4
-----									
North: Lake Dr									
	East	L2	37.3	37.3	3266.2#	59.7#	4.0	4.0	0.1
	West	R2	36.0	36.0	3266.2#	61.8#	53.8	53.8	1.5
-----									
West: Lake Dr									
	North	L2	37.7	37.7	3347.7#	60.6#	0.7	0.7	0.0
	East	T1	37.6	37.6	3347.7#	60.8#	4.1	4.1	0.1
-----									
ALL VEHICLES:			37.0	37.0	3272.9#	60.3#	420.4	420.4	11.4
-----									

"Running Speed" is the average speed excluding stopped periods.

Travel Time values include cruise times and intersection delays including acceleration, deceleration and idling delays.

# Travel Distance and Travel Time values include travel on the External Exit section based on the Exit Distance or user-specified Downstream Distance value as applicable.

#### INTERSECTION NEGOTIATION DATA

From Approach	To Exit	Turn	Negn Radius ft	Negn Speed mph	Negn Dist. ft	Appr. Dist. ft	Exit Dist. ft	Downstr. Dist. ft
-----								
East: SE 62nd St								
	West	T1	194.9	24.6	134.4	1600	488	NA
	North	R2	119.4	20.5	54.0	1600	488	NA
-----								
North: Lake Dr								
	East	L2	58.0	15.6	227.8	1600	488	NA
	West	R2	119.4	20.5	54.0	1600	488	NA
-----								
West: Lake Dr								
	North	L2	58.0	15.6	227.8	1600	488	NA
	East	T1	194.9	24.6	134.4	1600	488	NA
-----								

Maximum Negotiation (Design) Speed = 30.0 mph

NA Downstream Distance does not apply if:

- Exit is an internal leg of a network
- "Program" option was specified
- Distance specified was less than the Exit Negotiation Distance
- Distance specified was greater than the exit leg length

#### MOVEMENT SPEEDS AND GEOMETRIC DELAY

		App. Speeds		Exit Speeds		Queue	Geom Delay sec
Mov		Cruise	Negn	Negn	Cruise	Move-up	
ID	Turn	mph	mph	mph	mph	Speed mph	
East: SE 62nd St							
6	T1	40.0	24.6	24.6	40.0	34.5	3.8
16	R2	40.0	20.5	20.5	40.0	34.5	3.9
North: Lake Dr							
7	L2	40.0	15.6	15.6	40.0	32.4	9.8
14	R2	40.0	20.5	20.5	40.0	32.4	3.9
West: Lake Dr							
5	L2	40.0	15.6	15.6	40.0	37.6	9.8
2	T1	40.0	24.6	24.6	40.0	37.6	3.8

[Go to Table Links \(Top\)](#)

#### Movement Capacity and Performance Parameters

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### MOVEMENT CAPACITY PARAMETERS

Mov ID	Turn	Mov Cl.	Arv Flow veh/h	Opng Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Deg. Satn x
-----									
East: SE 62nd St									
6	T1	#	136	1	1	341	0.85	113	0.399*
16	R2	#	441	1	1	1106	0.85	113	0.399*
-----									
North: Lake Dr									
7	L2	#	7	136	139	92	0.85	1099	0.071
14	R2	#	87	136	139	1226	0.85	1099	0.071
-----									
West: Lake Dr									
5	L2	#	1	7	7	206	0.85	****	0.005
2	T1	#	7	7	7	1235	0.85	****	0.005
-----									

\* Maximum degree of saturation

# Combined Movement Capacity parameters are shown for all Movement Classes.

## MOVEMENT PERFORMANCE

Mov ID	Turn	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-mi/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (mph)
East: SE 62nd St										
6	T1	0.14	0.17	3.8	0.44	59.4	4.51	84.2	2.2	38.1
16	R2	0.48	0.57	3.9	0.44	193.0	10.31	273.6	7.4	36.9
North: Lake Dr										
7	L2	0.02	0.02	10.2	0.49	3.2	0.38	4.0	0.1	37.3
14	R2	0.10	0.13	4.3	0.49	42.3	1.92	53.8	1.5	36.0
West: Lake Dr										
5	L2	0.00	0.00	9.8	0.42	0.5	0.04	0.7	0.0	37.7
2	T1	0.01	0.01	3.8	0.42	2.8	0.14	4.1	0.1	37.6

[Go to Table Links \(Top\)](#)

### Fuel Consumption, Emissions and Cost

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

## FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov ID	Turn	Cost Total \$/h	Fuel Total gal/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
East: SE 62nd St							
6	T1	29.96	3.1	27.5	0.04	0.002	0.032
16	R2	97.31	10.0	89.3	0.12	0.008	0.105
		127.27	13.1	116.8	0.15	0.010	0.138
North: Lake Dr							
7	L2	1.52	0.2	1.4	0.00	0.000	0.002
14	R2	20.29	2.0	18.3	0.02	0.002	0.022
		21.81	2.2	19.6	0.03	0.002	0.024
West: Lake Dr							
5	L2	0.25	0.0	0.2	0.00	0.000	0.000
2	T1	1.48	0.1	1.3	0.00	0.000	0.002
		1.72	0.2	1.5	0.00	0.000	0.002
INTERSECTION:		150.80	15.4	138.0	0.18	0.012	0.163

## FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov ID	Turn	Cost Rate \$/mi	Fuel Eff. mpg	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
East: SE 62nd St							
6	T1	0.22	27.4	202.8	0.26	0.017	0.239
16	R2	0.22	27.4	202.8	0.26	0.017	0.239
		0.22	27.4	202.8	0.26	0.017	0.239
North: Lake Dr							
7	L2	0.23	26.3	211.1	0.27	0.018	0.253
14	R2	0.23	26.3	211.1	0.27	0.018	0.253
		0.23	26.3	211.1	0.27	0.018	0.253
West: Lake Dr							
5	L2	0.22	28.0	198.3	0.26	0.017	0.230
2	T1	0.22	28.0	198.3	0.26	0.017	0.230

	0.22	28.0	198.3	0.26	0.017	0.230
INTERSECTION:	0.22	27.3	203.9	0.26	0.018	0.241

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## Lanes

### Lane Performance and Capacity Information Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### LANE PERFORMANCE

Lane No.	Flow veh/h	Cap veh/h	Deg. Satn x	Aver. Delay sec	Eff. Stop Rate	Q u e u e 95% Back veh	ft	Lane Length ft
East: SE 62nd St 1	577	1447	0.399	3.9	0.44	2.4	60.9	1600.0
North: Lake Dr 1	93	1318	0.071	4.8	0.49	0.3	7.5	1600.0
West: Lake Dr 1	8	1441	0.005	4.7	0.42	0.0	0.6	1600.0

#### LANE FLOW AND CAPACITY INFORMATION

Lane No.	Total Arv Flow (veh/h)	Min Cap veh/h	Tot Cap veh/h	Deg. Satn x	Lane Util %
East: SE 62nd St 1	577	150	1447	0.399	100
North: Lake Dr 1	93	93	1318	0.071	100
West: Lake Dr 1	8	8	1441	0.005	100

The capacity values of Continuous Lanes are obtained by adjusting the basic saturation flow for lane width, grade, movement class and turning vehicle effects. Saturation flow scale applies if specified.

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### Lane, Approach and Intersection Performance Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

Lane No.	Arrival Flow (veh/h)	%HV	Adj. Basic Satf.	Deg Sat x	Aver. Delay sec	Longest Queue ft	Lane Length ft
East: SE 62nd St 1	577	2		0.399	3.9	61	1600
	577	2		0.399	3.9	61	
North: Lake Dr 1	93	2		0.071	4.8	8	1600

-----						
	93	2	0.071	4.8	8	
-----						
West: Lake Dr	8	2	0.005	4.7	1	1600
1						
-----						
	8	2	0.005	4.7	1	
=====						
ALL VEHICLES						
Total	%		Max	Aver.	Max	
Flow	HV		X	Delay	Queue	
678	2		0.399	4.0	61	
=====						
Peak flow period = 15 minutes.						
Queue values in this table are 95% queue (feet)						
Note: Basic Saturation Flows at roundabouts or sign-controlled						
intersections apply only to continuous lanes.						

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### Driver Characteristics

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

-----						
Lane No.	Satn Speed mph	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing ft	Average Queue Space ft	Driver Response Time sec
-----						
East: SE 62nd St						
1	21.4	1449	2.49	78.17	25.40	1.68
-----						
North: Lake Dr						
1	20.1	1480	2.43	71.80	25.40	1.57
-----						
West: Lake Dr						
1	23.3	1450	2.48	84.99	25.40	1.74
-----						

Saturation Flow and Saturation Headway are derived from follow-up headway.

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### Lane Delays

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### LANE DELAYS

-----												
				Delay (seconds/veh)								
Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Stop-line 1st d1	Delay 2nd d2	Total dSL	Acc. Dec. dn	Queuing dq	Stopd dqm	Geom di	Control dig	
-----												
East: SE 62nd St												
1	0.399	NA	NA	0.0	0.0	0.0	0.1	0.0	0.0	0.0	3.9	3.9
-----												
North: Lake Dr												
1	0.071	NA	NA	0.5	0.0	0.5	1.1	0.0	0.0	0.0	4.3	4.8
-----												
West: Lake Dr												
1	0.005	NA	NA	0.0	0.0	0.0	0.2	0.0	0.0	0.0	4.7	4.7
-----												

SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay.

dSL: Stop-line delay (=d1+d2)

dn: Average stop-start delay for all vehicles queued and unqueued

dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay)

dqm: Queue move-up delay

di: Stopped delay (stopped (idling) time at near-zero speed)

dig: Geometric delay  
dic: Control delay

[Go to Table Links \(Top\)](#)

### Lane Queues

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### LANE QUEUES (VEHICLES)

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (veh)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
					Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: SE 62nd St														
1	0.399	NA	NA	0.0	1.0	0.0	1.0	2.4	0.02	0.04	0.0	NA	0.0	0.0
North: Lake Dr														
1	0.071	NA	NA	0.0	0.1	0.0	0.1	0.3	0.00	0.00	0.0	NA	0.0	0.0
West: Lake Dr														
1	0.005	NA	NA	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	NA	0.0	0.0

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUES (DISTANCE)

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (ft)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
					Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: SE 62nd St														
1	0.399	NA	NA	0.0	24.5	0.0	24.5	60.9	0.02	0.04	0.0	NA	0.0	0.0
North: Lake Dr														
1	0.071	NA	NA	0.0	3.0	0.0	3.0	7.5	0.00	0.00	0.0	NA	0.3	0.6
West: Lake Dr														
1	0.005	NA	NA	0.0	0.2	0.0	0.2	0.6	0.00	0.00	0.0	NA	0.0	0.0

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

[Go to Table Links \(Top\)](#)

### Lane Queue Percentiles

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### LANE QUEUE PERCENTILES (VEHICLES)

Lane No.	Deg. Satn x	Percentile Back of Queue (veh)						
		50%	70%	85%	90%	95%	98%	100%
East: SE 62nd St								
1	0.399	1.0	1.2	1.8	2.0	2.4	2.7	2.9
North: Lake Dr								
1	0.071	0.1	0.2	0.2	0.3	0.3	0.3	0.4
West: Lake Dr								
1	0.005	0.0	0.0	0.0	0.0	0.0	0.0	0.0



SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUE PERCENTILES (DISTANCE)

Lane No.	Deg. Satn x	Percentile Back of Queue (feet)						
		50%	70%	85%	90%	95%	98%	100%
East: SE 62nd St								
1	0.399	24.5	31.7	44.7	51.7	60.9	67.5	72.6
North: Lake Dr								
1	0.071	3.0	3.9	5.5	6.4	7.5	8.4	9.0
West: Lake Dr								
1	0.005	0.2	0.3	0.4	0.5	0.6	0.6	0.7

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

[Go to Table Links \(Top\)](#)

### Lane Stops

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	-- Effective Stop Rate --				Total Stops H	Queue Move-up Rate	Total Queue Move-ups	Prop. Queued pq	Aver. Num. of Cycles to Depart
	x			he1	he2	Geom. hig	Overall h		hqm	Hqm		
East: SE 62nd St												
1	0.399	NA	NA	0.00	0.00	0.44	0.44	252.5	0.00	0.0	0.02	0.02
North: Lake Dr												
1	0.071	NA	NA	0.12	0.00	0.37	0.49	45.4	0.00	0.0	0.24	0.24
West: Lake Dr												
1	0.005	NA	NA	0.01	0.00	0.42	0.42	3.2	0.00	0.0	0.04	0.04

hig is the average value for all movements in a shared lane

hqm is average queue move-up rate for all vehicles queued and unqueued

[Go to Table Links \(Top\)](#)

### Flow Rates

#### Origin-Destination Flow Rates (Total)

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### TOTAL FLOW RATES for All Movement Classes (veh/h)

From EAST To:			
Turn:	W	N	TOT
Flow Rate	135.9	441.3	577.2
%HV (all designations)	2.0	2.0	2.0
From NORTH To:			
Turn:	E	W	TOT
Flow Rate	6.5	87.0	93.5
%HV (all designations)	2.0	2.0	2.0
From WEST To:			
Turn:	N	E	TOT
Flow Rate	1.1	6.5	7.6

%HV (all designations)	2.0	2.0	2.0
------------------------	-----	-----	-----

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

### Origin-Destination Flow Rates by Movement Class

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### FLOW RATES for Light Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	133.2	432.5	565.6
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	6.4	85.2	91.6
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	1.1	6.4	7.5
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0

#### FLOW RATES for Heavy Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	2.7	8.8	11.5
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	0.1	1.7	1.9
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	0.0	0.1	0.2
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Lane Flow Rates

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

### LANE FLOW RATES AT STOP LINE (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
-----			
Lane 1			
LV	133.2	432.5	565.6
HV	2.7	8.8	11.5
Total	135.9	441.3	577.2
-----			
Approach	135.9	441.3	577.2
-----			
From NORTH To:	E	W	
Turn:	L2	R2	TOT
-----			
Lane 1			
LV	6.4	85.2	91.6
HV	0.1	1.7	1.9
Total	6.5	87.0	93.5
-----			
Approach	6.5	87.0	93.5
-----			
From WEST To:	N	E	
Turn:	L2	T1	TOT
-----			
Lane 1			
LV	1.1	6.4	7.5
HV	0.0	0.1	0.2
Total	1.1	6.5	7.6
-----			
Approach	1.1	6.5	7.6
-----			

### EXIT LANE FLOW RATES

Movement Class:	LV	HV	TOT
-----			
Exit: EAST			
Lane: 1	12.8	0.3	13.0
Total	12.8	0.3	13.0
-----			
Exit: NORTH			
Lane: 1	433.5	8.8	442.4
Total	433.5	8.8	442.4
-----			
Exit: WEST			
Lane: 1	218.4	4.5	222.8
Total	218.4	4.5	222.8
-----			

### DOWNSTREAM LANE FLOW RATES FOR EXIT ROADS

Movement Class:	LV	HV	TOT
-----			
Exit: EAST			
Lane: 1	12.8	0.3	13.0
Total	12.8	0.3	13.0
-----			

Exit: NORTH			
Lane: 1	433.5	8.8	442.4
Total	433.5	8.8	442.4
-----			
Exit: WEST			
Lane: 1	218.4	4.5	222.8
Total	218.4	4.5	222.8
-----			

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Other

### Parameter Settings Summary

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

\* Basic Parameters:  
 Intersection Type: Roundabout  
 Driving on the right-hand side of the road  
 Input data specified in US units  
 Model Defaults: US HCM (Customary)  
 Peak Flow Period (for performance): 15 minutes  
 Unit time (for volumes): 60 minutes.  
 SIDRA Standard Delay model used  
 HCM Queue Model option used  
 Level of Service based on: Delay and v/c (HCM 2010)  
 Queue percentile: 95%

[Go to Table Links \(Top\)](#)

### Diagnostics

Site: 9. 62nd & Lake - 2026 AM No Build

Site ID:  
Roundabout

#### Flow-Capacity Iterations:

Largest change in degree of saturation for any lane = 0.1 %  
 Largest change in capacity for any lane = 1 veh/h

Other Diagnostic Messages (if any):

[Go to Table Links \(Top\)](#)

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Organisation: TRANSPORTATION SOLUTIONS INC | Processed: Thursday, March 15, 2018 8:52:35 AM

Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22

Comment Response\2026 62nd & Lake RAB.sip7

Intersection

Int Delay, s/veh 3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	126	0	20	185	6	13
Future Vol, veh/h	126	0	20	185	6	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	137	0	22	201	7	14

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	223	0	0 396 122
Stage 1	-	-	- 122 -
Stage 2	-	-	- 274 -
Critical Hdwy	4.1	-	- 6.4 6.2
Critical Hdwy Stg 1	-	-	- 5.4 -
Critical Hdwy Stg 2	-	-	- 5.4 -
Follow-up Hdwy	2.2	-	- 3.5 3.3
Pot Cap-1 Maneuver	1358	-	- 613 935
Stage 1	-	-	- 908 -
Stage 2	-	-	- 777 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1358	-	- 551 935
Mov Cap-2 Maneuver	-	-	- 551 -
Stage 1	-	-	- 908 -
Stage 2	-	-	- 699 -

Approach	EB	WB	SB
HCM Control Delay, s	7.9	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1358	-	-	-	551	935
HCM Lane V/C Ratio	0.101	-	-	-	0.012	0.015
HCM Control Delay (s)	7.9	0	-	-	11.6	8.9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0.3	-	-	-	0	0

Intersection

Intersection Delay, s/veh	18.5
Intersection LOS	C







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↱	↱		↰↱			↰↱	
Traffic Vol, veh/h	103	157	64	17	288	315	153	189	26	15	24	72
Future Vol, veh/h	103	157	64	17	288	315	153	189	26	15	24	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	112	171	70	18	313	342	166	205	28	16	26	78
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	16	20.7	18.9	12.5
HCM LOS	C	C	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	62%	0%	100%	0%	6%	0%	56%	0%
Vol Thru, %	38%	78%	0%	71%	94%	0%	44%	14%
Vol Right, %	0%	22%	0%	29%	0%	100%	0%	86%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	248	121	103	221	305	315	27	84
LT Vol	153	0	103	0	17	0	15	0
Through Vol	95	95	0	157	288	0	12	12
RT Vol	0	26	0	64	0	315	0	72
Lane Flow Rate	269	131	112	240	332	342	29	91
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.594	0.274	0.251	0.491	0.658	0.61	0.071	0.199
Departure Headway (Hd)	7.95	7.53	8.067	7.362	7.143	6.416	8.671	7.849
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	455	477	444	490	507	562	413	457
Service Time	5.7	5.28	5.822	5.117	4.891	4.163	6.433	5.611
HCM Lane V/C Ratio	0.591	0.275	0.252	0.49	0.655	0.609	0.07	0.199
HCM Control Delay	21.7	13.1	13.5	17.1	22.7	18.7	12.1	12.6
HCM Lane LOS	C	B	B	C	C	C	B	B
HCM 95th-tile Q	3.8	1.1	1	2.7	4.7	4.1	0.2	0.7

HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	152	18	39	492	61	56	1	10	42	1	62
Future Vol, veh/h	29	152	18	39	492	61	56	1	10	42	1	62
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	31	163	19	42	529	66	60	1	11	45	1	67

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	598	0	0	194	0	0	926	927	184	890	905	565
Stage 1	-	-	-	-	-	-	246	246	-	649	649	-
Stage 2	-	-	-	-	-	-	680	681	-	241	256	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	989	-	-	1391	-	-	251	267	864	266	278	528
Stage 1	-	-	-	-	-	-	762	701	-	462	469	-
Stage 2	-	-	-	-	-	-	444	449	-	767	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	989	-	-	1391	-	-	207	248	856	249	258	527
Mov Cap-2 Maneuver	-	-	-	-	-	-	207	248	-	249	258	-
Stage 1	-	-	-	-	-	-	731	673	-	446	454	-
Stage 2	-	-	-	-	-	-	375	434	-	732	671	-








Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.5	27.1	19.4
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	234	989	-	-	1391	-	-	362
HCM Lane V/C Ratio	0.308	0.032	-	-	0.03	-	-	0.312
HCM Control Delay (s)	27.1	8.8	-	-	7.7	-	-	19.4
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.3	0.1	-	-	0.1	-	-	1.3



HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	5.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	159	10	33	462	53	0	0	115	70	0	131
Future Vol, veh/h	36	159	10	33	462	53	0	0	115	70	0	131
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	38	167	11	35	486	56	0	0	121	74	0	138







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	544	0	0	179	0	0	-	-	174	834	-	542
Stage 1	-	-	-	-	-	-	-	-	-	586	-	-
Stage 2	-	-	-	-	-	-	-	-	-	248	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	1035	-	-	1409	-	-	0	0	875	290	0	544
Stage 1	-	-	-	-	-	-	0	0	-	500	0	-
Stage 2	-	-	-	-	-	-	0	0	-	760	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1013	-	-	1409	-	-	-	-	874	238	-	531
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	238	-	-
Stage 1	-	-	-	-	-	-	-	-	-	480	-	-
Stage 2	-	-	-	-	-	-	-	-	-	630	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.5			0.5			9.8			18.5		
HCM LOS							A			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	874	1013	-	-	1409	-	-	238	531
HCM Lane V/C Ratio	0.139	0.037	-	-	0.025	-	-	0.31	0.26
HCM Control Delay (s)	9.8	8.7	-	-	7.6	-	-	26.8	14.1
HCM Lane LOS	A	A	-	-	A	-	-	D	B
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	1.3	1

Intersection

Intersection Delay, s/veh	12.3
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	260	96	294	274	20	131
Future Vol, veh/h	260	96	294	274	20	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	283	104	320	298	22	142
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	13.3	12.1	10.7
HCM LOS	B	B	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	260	96	294	274	20	131
LT Vol	260	0	0	0	20	0
Through Vol	0	96	294	0	0	0
RT Vol	0	0	0	274	0	131
Lane Flow Rate	283	104	320	298	22	142
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.488	0.165	0.49	0.4	0.044	0.24
Departure Headway (Hd)	6.213	5.707	5.516	4.832	7.291	6.073
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	582	629	655	751	492	591
Service Time	3.941	3.436	3.239	2.532	5.028	3.809
HCM Lane V/C Ratio	0.486	0.165	0.489	0.397	0.045	0.24
HCM Control Delay	14.7	9.6	13.4	10.7	10.4	10.7
HCM Lane LOS	B	A	B	B	B	B
HCM 95th-tile Q	2.7	0.6	2.7	1.9	0.1	0.9

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5

Timing Plan: PM

Intersection												
Int Delay, s/veh	5.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	58	1	12	51	9	134	19	359	1	3	93	16
Future Vol, veh/h	58	1	12	51	9	134	19	359	1	3	93	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	63	1	13	55	10	146	21	390	1	3	101	17






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	626	549	110	555	557	391	118	0	0	391	0	0
Stage 1	116	116	-	432	432	-	-	-	-	-	-	-
Stage 2	510	433	-	123	125	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	400	446	949	445	442	662	1483	-	-	1179	-	-
Stage 1	894	803	-	606	586	-	-	-	-	-	-	-
Stage 2	550	585	-	886	796	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	303	439	949	432	435	662	1483	-	-	1179	-	-
Mov Cap-2 Maneuver	303	439	-	432	435	-	-	-	-	-	-	-
Stage 1	881	801	-	597	578	-	-	-	-	-	-	-
Stage 2	416	577	-	870	794	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	18.5		15		0.4		0.2	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1483	-	-	344 569	1179	-	-
HCM Lane V/C Ratio	0.014	-	-	0.224 0.371	0.003	-	-
HCM Control Delay (s)	7.5	-	-	18.5 15	8.1	-	-
HCM Lane LOS	A	-	-	C C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.8 1.7	0	-	-






HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection						
Int Delay, s/veh	1.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	13	14	351	150	6
Future Vol, veh/h	28	13	14	351	150	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	30	14	15	382	163	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	578	166	170	0	-	0
Stage 1	166	-	-	-	-	-
Stage 2	412	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	481	884	1420	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	673	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	476	884	1420	-	-	-
Mov Cap-2 Maneuver	476	-	-	-	-	-
Stage 1	868	-	-	-	-	-
Stage 2	666	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	12	0.3		0		
HCM LOS	B					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1420	-	558	-	-	
HCM Lane V/C Ratio	0.011	-	0.08	-	-	
HCM Control Delay (s)	7.6	-	12	-	-	
HCM Lane LOS	A	-	B	-	-	
HCM 95th %tile Q(veh)	0	-	0.3	-	-	

HCM 2010 TWSC  
7: Lake Drive & Garage/Trading Building Driveway








Costco Buildings 4 and 5  
Timing Plan: PM

Intersection						
Int Delay, s/veh	4.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	119	130	235	0	0	163
Future Vol, veh/h	119	130	235	0	0	163
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	129	141	255	0	0	177
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	432	255	0	0	255	0
Stage 1	255	-	-	-	-	-
Stage 2	177	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	584	789	-	-	1322	-
Stage 1	792	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	584	789	-	-	1322	-
Mov Cap-2 Maneuver	584	-	-	-	-	-
Stage 1	792	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11.7	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 584 789	1322	-		
HCM Lane V/C Ratio	-	- 0.221 0.179	-	-		
HCM Control Delay (s)	-	- 12.9 10.6	0	-		
HCM Lane LOS	-	- B B	A	-		
HCM 95th %tile Q(veh)	-	- 0.8 0.6	0	-		

HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Costco Buildings 4 and 5

Timing Plan: PM

Intersection												
Int Delay, s/veh	2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	0	58	2	3	4	20	209	1	0	270	12
Future Vol, veh/h	22	0	58	2	3	4	20	209	1	0	270	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	24	0	63	2	3	4	22	227	1	0	293	13

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	575	572	300	603	578	228	307	0	0	228	0	0
Stage 1	300	300	-	271	271	-	-	-	-	-	-	-
Stage 2	275	272	-	332	307	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	432	433	744	414	430	816	1265	-	-	1352	-	-
Stage 1	713	669	-	739	689	-	-	-	-	-	-	-
Stage 2	736	688	-	686	665	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	422	425	744	374	423	816	1265	-	-	1352	-	-
Mov Cap-2 Maneuver	422	425	-	374	423	-	-	-	-	-	-	-
Stage 1	701	669	-	726	677	-	-	-	-	-	-	-
Stage 2	716	676	-	628	665	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.3		12.1		0.7		0	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1265	-	-	422	744	519	1352	-	-
HCM Lane V/C Ratio	0.017	-	-	0.057	0.085	0.019	-	-	-
HCM Control Delay (s)	7.9	-	-	14	10.3	12.1	0	-	-
HCM Lane LOS	A	-	-	B	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.3	0.1	0	-	-

# MOVEMENT SUMMARY

 **Site: [9. 62nd & Lake - 2026 PM No Build]**

Costco Buildings 4 and 5  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: SE 62nd St											
6	T1	60	2.0	0.210	3.8	LOS A	1.2	29.6	0.05	0.43	38.0
16	R2	242	2.0	0.210	3.9	LOS A	1.2	29.6	0.05	0.43	36.8
Approach		302	2.0	0.210	3.9	LOS A	1.2	29.6	0.05	0.43	37.0
North: Lake Dr											
7	L2	345	2.0	0.259	10.0	LOS B	1.3	32.9	0.19	0.62	34.6
14	R2	14	2.0	0.259	4.1	LOS A	1.3	32.9	0.19	0.62	33.6
Approach		359	2.0	0.259	9.8	LOS A	1.3	32.9	0.19	0.62	34.6
West: Lake Dr											
5	L2	5	2.0	0.191	11.2	LOS B	1.0	24.7	0.46	0.53	36.5
2	T1	213	2.0	0.191	5.3	LOS A	1.0	24.7	0.46	0.53	36.4
Approach		218	2.0	0.191	5.4	LOS A	1.0	24.7	0.46	0.53	36.4
All Vehicles		879	2.0	0.259	6.7	LOS A	1.3	32.9	0.21	0.53	35.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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2026 62nd & Lake RAB.sip7








DETAILED OUTPUT

 Site: [9. 62nd & Lake - 2026 PM No Build]

Costco Buildings 4 and 5  
Roundabout

OUTPUT TABLE LINKS

-  Roundabouts
  - Roundabout Basic Parameters
  - Roundabout Circulating / Exiting Stream Parameters
  - Roundabout Gap Acceptance Parameters
  - Roundabout Flow Rates
-  Movements
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-  Lanes
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  - Origin-Destination Flow Rates by Movement Class
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  - Parameter Settings Summary
  - Diagnostics

Roundabouts

Roundabout Basic Parameters  
Site: 9. 62nd & Lake - 2026 PM No Build

Site ID: Roundabout												
Central Island Diam ft	Circ Width ft	Insc Diam. ft	Entry Radius ft	Entry Angle deg	Circ Lanes	Entry Lanes	Av.Entry Lane Width ft	Appr Dist ft	Prop Upstr	Queued Signal	Extra Bunching %	
East: SE 62nd St												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
North: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
West: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
Roundabout Capacity Model: SIDRA Standard												
NA Not Applicable (single Site analysis or unconnected Site in Network analysis).												
N Program option resulted in zero value (single Site analysis or unconnected Site in Network analysis).												

[Go to Table Links \(Top\)](#)

Roundabout Circulating / Exiting Stream Parameters  
Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	Opng Flow veh/h	HVE pcu/veh	Adj. Flow pcu/h	%Near Lane Only	%Exit Flow Incl.	Cap. Const. Effect	O-D Factor	Aver Speed mph	In-Bunch Headway sec	Prop. Bunched
East: SE 62nd St													
W	T1	1	Dominant	5	1.02	6	0.0	0.0	N	0.999	15.6	2.00	0.007
N	R2	1	Dominant	5	1.02	6	0.0	0.0	N	0.999	15.6	2.00	0.007
North: Lake Dr													
E	L2	1	Dominant	60	1.02	61	0.0	0.0	N	0.999	24.6	2.00	0.072
W	R2	1	Dominant	60	1.02	61	0.0	0.0	N	0.999	24.6	2.00	0.072
West: Lake Dr													
N	L2	1	Dominant	345	1.02	351	0.0	0.0	N	0.984	15.6	2.00	0.348
E	T1	1	Dominant	345	1.02	351	0.0	0.0	N	0.984	15.6	2.00	0.348
Roundabout Capacity Model: SIDRA Standard													

[Go to Table Links \(Top\)](#)

### Roundabout Gap Acceptance Parameters

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	In-Bunch Headway sec	Prop. Bunched	Priority Sharing	HVE for Entry	Critical Gap		Follow-up Headway sec
								Headway sec	Dist ft	
East: SE 62nd St										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
W	T1	1	Dominant	2.00	0.007	Y	1.02	4.38	100.0	2.48
N	R2	1	Dominant	2.00	0.007	Y	1.02	4.38	100.0	2.48
North: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
E	L2	1	Dominant	2.00	0.072	Y	1.02	4.29	155.0	2.46
W	R2	1	Dominant	2.00	0.072	Y	1.02	4.29	155.0	2.46
West: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
N	L2	1	Dominant	2.00	0.348	Y	1.02	3.87	88.3	2.35
E	T1	1	Dominant	2.00	0.348	Y	1.02	3.87	88.3	2.35

Roundabout Capacity Model: SIDRA Standard

Priority sharing means Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

[Go to Table Links \(Top\)](#)

### Roundabout Flow Rates

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

#### CIRCULATING LANE FLOW RATES

Lane No.	Circulating Flow Rate veh/h	pcu/h	Percent
East: SE 62nd St			
1	5	6	100.0%

Total	5	6	
-----			
North: Lake Dr			
1	60	61	100.0%
Total	60	61	
-----			
West: Lake Dr			
1	345	351	100.0%
Total	345	351	
-----			
The SIDRA Standard roundabout capacity model option is in use.			
This model takes into account the total circulating flow as well as the effect			
of flow distribution in circulating lanes on the entry capacity results.			
APPROACH LANE FLOW RATES			
-----			
Lane	Approach Flows (veh/h)		
No.	Out	To Downst	Total
-----			
East: SE 62nd St			
1	242	60	302
Total	242	60	302
-----			
North: Lake Dr			
1	14	345	359
Total	14	345	359
-----			
West: Lake Dr			
1	213	5	218
Total	213	5	218
-----			

[Go to Table Links \(Top\)](#)

## Movements

### Intersection Negotiation and Travel Data Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

#### TRAVEL SPEED, TRAVEL DISTANCE AND TRAVEL TIME

From Approach	To Exit	Turn	Running Speed mph	Travel Speed mph	Travel Distance ft	Travel Time s	Total Dem Flows veh-mi/h	Travel Distance Arv Flows veh-mi/h	Tot.Trav. Time veh-h/h
-----									
East: SE 62nd St									
	West	T1	38.0	38.0	3269.9#	58.6#	37.0	37.0	1.0
	North	R2	36.8	36.8	3269.9#	60.6#	150.1	150.1	4.1
-----									
North: Lake Dr									
	East	L2	34.6	34.6	3420.9#	67.4#	223.2	223.2	6.4
	West	R2	33.6	33.6	3420.9#	69.5#	9.2	9.2	0.3
-----									
West: Lake Dr									
	North	L2	36.5	36.5	3336.7#	62.3#	3.4	3.4	0.1
	East	T1	36.4	36.4	3336.7#	62.5#	134.6	134.6	3.7
-----									
ALL VEHICLES:			35.9	35.8	3348.1#	63.7#	557.6	557.6	15.6
-----									

"Running Speed" is the average speed excluding stopped periods.

Travel Time values include cruise times and intersection delays including acceleration, deceleration and idling delays.

# Travel Distance and Travel Time values include travel on the External Exit section based on the Exit Distance or user-specified Downstream Distance value as applicable.

#### INTERSECTION NEGOTIATION DATA

From Approach	To Exit	Turn	Negn Radius ft	Negn Speed mph	Negn Dist. ft	Appr. Dist. ft	Exit Dist. ft	Downstr. Dist. ft
-----								
East: SE 62nd St								
	West	T1	194.9	24.6	134.4	1600	488	NA
	North	R2	119.4	20.5	54.0	1600	488	NA
-----								
North: Lake Dr								
	East	L2	58.0	15.6	227.8	1600	488	NA
	West	R2	119.4	20.5	54.0	1600	488	NA
-----								
West: Lake Dr								
	North	L2	58.0	15.6	227.8	1600	488	NA
	East	T1	194.9	24.6	134.4	1600	488	NA
-----								

Maximum Negotiation (Design) Speed = 30.0 mph

NA Downstream Distance does not apply if:

- Exit is an internal leg of a network
- "Program" option was specified
- Distance specified was less than the Exit Negotiation Distance
- Distance specified was greater than the exit leg length

#### MOVEMENT SPEEDS AND GEOMETRIC DELAY

		App. Speeds		Exit Speeds		Queue	Geom Delay sec
Mov		Cruise	Negn	Negn	Cruise	Move-up	
ID	Turn	mph	mph	mph	mph	Speed mph	
East: SE 62nd St							
6	T1	40.0	24.6	24.6	40.0	34.3	3.8
16	R2	40.0	20.5	20.5	40.0	34.3	3.9
North: Lake Dr							
7	L2	40.0	15.6	15.6	40.0	25.4	9.8
14	R2	40.0	20.5	20.5	40.0	25.4	3.9
West: Lake Dr							
5	L2	40.0	15.6	15.6	40.0	26.2	9.8
2	T1	40.0	24.6	24.6	40.0	26.2	3.8

[Go to Table Links \(Top\)](#)

#### Movement Capacity and Performance Parameters

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

#### MOVEMENT CAPACITY PARAMETERS

Mov ID	Turn	Mov Cl.	Arv Flow veh/h	Opng Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Deg. Satn x
-----									
East: SE 62nd St									
6	T1	#	60	5	6	285	0.85	305	0.210
16	R2	#	242	5	6	1156	0.85	305	0.210
-----									
North: Lake Dr									
7	L2	#	345	60	61	1332	0.85	229	0.259*
14	R2	#	14	60	61	55	0.85	229	0.259*
-----									
West: Lake Dr									
5	L2	#	5	345	351	28	0.85	345	0.191
2	T1	#	213	345	351	1114	0.85	345	0.191
-----									

\* Maximum degree of saturation

# Combined Movement Capacity parameters are shown for all Movement Classes.

## MOVEMENT PERFORMANCE

Mov ID	Turn	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-mi/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (mph)
East: SE 62nd St										
6	T1	0.06	0.08	3.8	0.43	25.9	2.07	37.0	1.0	38.0
16	R2	0.26	0.31	3.9	0.43	105.1	5.54	150.1	4.1	36.8
North: Lake Dr										
7	L2	0.96	1.15	10.0	0.62	212.4	8.76	223.2	6.4	34.6
14	R2	0.02	0.02	4.1	0.62	8.7	1.34	9.2	0.3	33.6
West: Lake Dr										
5	L2	0.02	0.02	11.2	0.53	2.9	0.90	3.4	0.1	36.5
2	T1	0.31	0.37	5.3	0.53	112.2	5.08	134.6	3.7	36.4

[Go to Table Links \(Top\)](#)

### Fuel Consumption, Emissions and Cost

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

## FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov ID	Turn	Cost Total \$/h	Fuel Total gal/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
East: SE 62nd St							
6	T1	13.26	1.4	12.2	0.02	0.001	0.014
16	R2	53.77	5.5	49.3	0.06	0.004	0.058
		67.03	6.9	61.4	0.08	0.005	0.073
North: Lake Dr							
7	L2	97.09	9.0	80.1	0.10	0.007	0.095
14	R2	3.98	0.4	3.3	0.00	0.000	0.004
		101.07	9.3	83.3	0.10	0.007	0.098
West: Lake Dr							
5	L2	1.29	0.1	1.1	0.00	0.000	0.001
2	T1	50.48	5.0	44.8	0.06	0.004	0.053
		51.76	5.1	46.0	0.06	0.004	0.055
INTERSECTION:		219.86	21.3	190.7	0.24	0.017	0.226

## FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov ID	Turn	Cost Rate \$/mi	Fuel Eff. Rate mpg	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
East: SE 62nd St							
6	T1	0.22	27.3	203.9	0.26	0.018	0.241
16	R2	0.22	27.3	203.9	0.26	0.018	0.241
		0.22	27.3	203.9	0.26	0.018	0.241
North: Lake Dr							
7	L2	0.27	24.9	222.9	0.28	0.020	0.263
14	R2	0.27	24.9	222.9	0.28	0.020	0.263
		0.27	24.9	222.9	0.28	0.020	0.263
West: Lake Dr							
5	L2	0.23	26.9	206.9	0.27	0.018	0.246
2	T1	0.23	26.9	206.9	0.27	0.018	0.246

	0.23	26.9	206.9	0.27	0.018	0.246
INTERSECTION:	0.25	26.1	212.5	0.27	0.019	0.251

[Go to Table Links \(Top\)](#)

## Lanes

### Lane Performance and Capacity Information Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

#### LANE PERFORMANCE

Lane No.	Flow veh/h	Cap veh/h	Deg. Satn x	Aver. Delay sec	Eff. Stop Rate	Q u e u e 95% Back		Lane Length ft
						veh	ft	
East: SE 62nd St								
1	302	1441	0.210	3.9	0.43	1.2	29.6	1600.0
North: Lake Dr								
1	359	1387	0.259	9.8	0.62	1.3	32.9	1600.0
West: Lake Dr								
1	218	1143	0.191	5.4	0.53	1.0	24.7	1600.0

#### LANE FLOW AND CAPACITY INFORMATION

Lane No.	Total Arv Flow (veh/h)	Min Cap veh/h	Tot Cap veh/h	Deg. Satn x	Lane Util %
East: SE 62nd St					
1	302	150	1441	0.210	100
North: Lake Dr					
1	359	150	1387	0.259	100
West: Lake Dr					
1	218	150	1143	0.191	100

The capacity values of Continuous Lanes are obtained by adjusting the basic saturation flow for lane width, grade, movement class and turning vehicle effects. Saturation flow scale applies if specified.

[Go to Table Links \(Top\)](#)

### Lane, Approach and Intersection Performance Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

Lane No.	Arrival Flow (veh/h)	%HV	Adj. Basic Satf.	Deg Sat x	Aver. Delay sec	Longest Queue ft	Lane Length ft
East: SE 62nd St							
1	302	2		0.210	3.9	30	1600
	302	2		0.210	3.9	30	
North: Lake Dr							
1	359	2		0.259	9.8	33	1600

	359	2	0.259	9.8	33	
West: Lake Dr	218	2	0.191	5.4	25	1600
1	218	2	0.191	5.4	25	
=====						
ALL VEHICLES						
Total	%		Max	Aver.	Max	
Flow	HV		X	Delay	Queue	
879	2		0.259	6.7	33	
=====						
Peak flow period = 15 minutes.						
Queue values in this table are 95% queue (feet)						
Note: Basic Saturation Flows at roundabouts or sign-controlled intersections apply only to continuous lanes.						

[Go to Table Links \(Top\)](#)

### Driver Characteristics

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

Lane No.	Satn Speed mph	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing ft	Average Queue Space ft	Driver Response Time sec
East: SE 62nd St						
1	21.3	1450	2.48	77.54	25.40	1.67
North: Lake Dr						
1	15.8	1462	2.46	56.90	25.40	1.36
West: Lake Dr						
1	24.4	1531	2.35	84.18	25.40	1.64

Saturation Flow and Saturation Headway are derived from follow-up headway.

[Go to Table Links \(Top\)](#)

### Lane Delays

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

#### LANE DELAYS

Lane No.	Deg. x	% Arv During Green	Prog. Factor	Stop-line Delay			Delay (seconds/veh)					
				1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing dq	Stopd dqm	(Idle) di	Geom dig	Control dic
East: SE 62nd St												
1	0.210	NA	NA	0.0	0.0	0.0	0.2	0.0	0.0	0.0	3.9	3.9
North: Lake Dr												
1	0.259	NA	NA	0.3	0.0	0.3	0.9	0.0	0.0	0.0	9.5	9.8
West: Lake Dr												
1	0.191	NA	NA	1.5	0.0	1.5	2.8	0.0	0.0	0.0	4.0	5.4

SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay.

dSL: Stop-line delay (=d1+d2)

dn: Average stop-start delay for all vehicles queued and unqueued

dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay)

dqm: Queue move-up delay

di: Stopped delay (stopped (idling) time at near-zero speed)

dig: Geometric delay  
dic: Control delay

[Go to Table Links \(Top\)](#)

### Lane Queues

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

#### LANE QUEUES (VEHICLES)

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (veh)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
					Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: SE 62nd St														
1	0.210	NA	NA	0.0	0.5	0.0	0.5	1.2	0.01	0.02	0.0	NA	0.0	0.0
North: Lake Dr														
1	0.259	NA	NA	0.0	0.5	0.0	0.5	1.3	0.01	0.02	0.0	NA	0.0	0.0
West: Lake Dr														
1	0.191	NA	NA	0.0	0.4	0.0	0.4	1.0	0.01	0.02	0.0	NA	0.1	0.2

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUES (DISTANCE)

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (ft)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
					Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: SE 62nd St														
1	0.210	NA	NA	0.0	11.9	0.0	11.9	29.6	0.01	0.02	0.0	NA	0.0	0.1
North: Lake Dr														
1	0.259	NA	NA	0.0	13.2	0.0	13.2	32.9	0.01	0.02	0.0	NA	0.7	1.2
West: Lake Dr														
1	0.191	NA	NA	0.0	9.9	0.0	9.9	24.7	0.01	0.02	0.0	NA	2.2	4.1

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

[Go to Table Links \(Top\)](#)

### Lane Queue Percentiles

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

#### LANE QUEUE PERCENTILES (VEHICLES)

Lane No.	Deg. Satn	Percentile Back of Queue (veh)						
	x	50%	70%	85%	90%	95%	98%	100%
East: SE 62nd St								
1	0.210	0.5	0.6	0.9	1.0	1.2	1.3	1.4
North: Lake Dr								
1	0.259	0.5	0.7	1.0	1.1	1.3	1.4	1.5
West: Lake Dr								
1	0.191	0.4	0.5	0.7	0.8	1.0	1.1	1.2



SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUE PERCENTILES (DISTANCE)

Lane No.	Deg. Satn x	Percentile Back of Queue (feet)						
		50%	70%	85%	90%	95%	98%	100%
East: SE 62nd St								
1	0.210	11.9	15.4	21.7	25.2	29.6	32.8	35.3
North: Lake Dr								
1	0.259	13.2	17.2	24.2	28.0	32.9	36.5	39.3
West: Lake Dr								
1	0.191	9.9	12.9	18.1	21.0	24.7	27.4	29.5

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

[Go to Table Links \(Top\)](#)

### Lane Stops

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	-- Effective Stop Rate --		Geom. Overall h	Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq	Aver. Num. of Cycles to Depart	
	x			he1	he2							
East: SE 62nd St												
1	0.210	NA	NA	0.01	0.00	0.43	0.43	131.0	0.00	0.0	0.05	0.05
North: Lake Dr												
1	0.259	NA	NA	0.08	0.00	0.54	0.62	221.1	0.00	0.0	0.19	0.19
West: Lake Dr												
1	0.191	NA	NA	0.32	0.00	0.21	0.53	115.1	0.00	0.0	0.46	0.46

hig is the average value for all movements in a shared lane

hqm is average queue move-up rate for all vehicles queued and unqueued

[Go to Table Links \(Top\)](#)

### Flow Rates

#### Origin-Destination Flow Rates (Total)

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

#### TOTAL FLOW RATES for All Movement Classes (veh/h)

From EAST To:			
Turn:	W	N	TOT
Flow Rate	59.8	242.4	302.2
%HV (all designations)	2.0	2.0	2.0
From NORTH To:			
Turn:	E	W	TOT
Flow Rate	344.6	14.1	358.7
%HV (all designations)	2.0	2.0	2.0
From WEST To:			
Turn:	N	E	TOT
Flow Rate	5.4	213.0	218.5

%HV (all designations)	2.0	2.0	2.0
------------------------	-----	-----	-----

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Origin-Destination Flow Rates by Movement Class

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

### FLOW RATES for Light Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	58.6	237.5	296.1
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	337.7	13.8	351.5
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	5.3	208.8	214.1
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0

### FLOW RATES for Heavy Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	1.2	4.8	6.0
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	6.9	0.3	7.2
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	0.1	4.3	4.4
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Lane Flow Rates

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

### LANE FLOW RATES AT STOP LINE (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Lane 1			
LV	58.6	237.5	296.1
HV	1.2	4.8	6.0
Total	59.8	242.4	302.2
Approach	59.8	242.4	302.2
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Lane 1			
LV	337.7	13.8	351.5
HV	6.9	0.3	7.2
Total	344.6	14.1	358.7
Approach	344.6	14.1	358.7
From WEST To:	N	E	
Turn:	L2	T1	TOT
Lane 1			
LV	5.3	208.8	214.1
HV	0.1	4.3	4.4
Total	5.4	213.0	218.5
Approach	5.4	213.0	218.5

### EXIT LANE FLOW RATES

Movement Class:	LV	HV	TOT
Exit: EAST			
Lane: 1	546.5	11.2	557.6
Total	546.5	11.2	557.6
Exit: NORTH			
Lane: 1	242.9	5.0	247.8
Total	242.9	5.0	247.8
Exit: WEST			
Lane: 1	72.4	1.5	73.9
Total	72.4	1.5	73.9

### DOWNSTREAM LANE FLOW RATES FOR EXIT ROADS

Movement Class:	LV	HV	TOT
Exit: EAST			
Lane: 1	546.5	11.2	557.6
Total	546.5	11.2	557.6

Exit: NORTH			
Lane: 1	242.9	5.0	247.8
Total	242.9	5.0	247.8
-----			
Exit: WEST			
Lane: 1	72.4	1.5	73.9
Total	72.4	1.5	73.9
-----			

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
Unit Time for Volumes = 60 minutes  
Peak Flow Period = 15 minutes  
Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Other

### Parameter Settings Summary

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

\* Basic Parameters:  
Intersection Type: Roundabout  
Driving on the right-hand side of the road  
Input data specified in US units  
Model Defaults: US HCM (Customary)  
Peak Flow Period (for performance): 15 minutes  
Unit time (for volumes): 60 minutes.  
SIDRA Standard Delay model used  
HCM Queue Model option used  
Level of Service based on: Delay and v/c (HCM 2010)  
Queue percentile: 95%

[Go to Table Links \(Top\)](#)

### Diagnostics

Site: 9. 62nd & Lake - 2026 PM No Build

Site ID:  
Roundabout

Flow-Capacity Iterations:

Largest change in degree of saturation for any lane = 0.0 %  
Largest change in capacity for any lane = 0 veh/h

Other Diagnostic Messages (if any):





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Organisation: TRANSPORTATION SOLUTIONS INC | Processed: Thursday, March 15, 2018 8:52:34 AM

Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22

Comment Response\2026 62nd & Lake RAB.sip7

Intersection						
Int Delay, s/veh	3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	172	62	6	29	83
Future Vol, veh/h	8	172	62	6	29	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	9	187	67	7	32	90
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	74	0	-	0	275	71
Stage 1	-	-	-	-	71	-
Stage 2	-	-	-	-	204	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1538	-	-	-	719	997
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1538	-	-	-	714	997
Mov Cap-2 Maneuver	-	-	-	-	714	-
Stage 1	-	-	-	-	957	-
Stage 2	-	-	-	-	829	-
Approach	EB	WB		SB		
HCM Control Delay, s	0.3	0		9.3		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1538	-	-	-	714	997
HCM Lane V/C Ratio	0.006	-	-	-	0.044	0.09
HCM Control Delay (s)	7.4	0	-	-	10.3	9
HCM Lane LOS	A	A	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0.3

**2026 With-Development LOS and Queue**

Intersection

Intersection Delay, s/veh	24.8
Intersection LOS	C







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱		↰↱			↰↱	
Traffic Vol, veh/h	2	383	14	4	75	83	6	10	2	351	51	13
Future Vol, veh/h	2	383	14	4	75	83	6	10	2	351	51	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	2	416	15	4	82	90	7	11	2	382	55	14
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	27.4	10.7	10.5	28.4
HCM LOS	D	B	B	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	55%	0%	100%	0%	5%	0%	93%	0%
Vol Thru, %	45%	71%	0%	96%	95%	0%	7%	66%
Vol Right, %	0%	29%	0%	4%	0%	100%	0%	34%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	7	2	397	79	83	377	39
LT Vol	6	0	2	0	4	0	351	0
Through Vol	5	5	0	383	75	0	26	26
RT Vol	0	2	0	14	0	83	0	13
Lane Flow Rate	12	8	2	432	86	90	409	42
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.026	0.016	0.004	0.768	0.168	0.158	0.782	0.073
Departure Headway (Hd)	7.814	7.38	6.919	6.404	7.046	6.321	6.88	6.254
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	460	487	514	561	512	571	524	570
Service Time	5.521	5.087	4.703	4.188	4.748	4.023	4.655	4.028
HCM Lane V/C Ratio	0.026	0.016	0.004	0.77	0.168	0.158	0.781	0.074
HCM Control Delay	10.7	10.2	9.7	27.5	11.2	10.2	30.3	9.5
HCM Lane LOS	B	B	A	D	B	B	D	A
HCM 95th-tile Q	0.1	0	0	6.9	0.6	0.6	7.1	0.2

HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	691	43	18	151	1	14	2	11	1	0	1
Future Vol, veh/h	2	691	43	18	151	1	14	2	11	1	0	1
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	2	743	46	19	162	1	15	2	12	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	166	0	0	800	0	0	983	986	777	982	1010	166
Stage 1	-	-	-	-	-	-	781	781	-	205	205	-
Stage 2	-	-	-	-	-	-	202	205	-	777	805	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1424	-	-	832	-	-	230	247	400	230	242	884
Stage 1	-	-	-	-	-	-	391	404	-	802	736	-
Stage 2	-	-	-	-	-	-	805	730	-	393	398	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1424	-	-	832	-	-	223	238	396	217	233	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	223	238	-	217	233	-
Stage 1	-	-	-	-	-	-	387	400	-	799	717	-
Stage 2	-	-	-	-	-	-	786	712	-	379	394	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	19.8	15.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	273	1424	-	-	832	-	-	348
HCM Lane V/C Ratio	0.106	0.002	-	-	0.023	-	-	0.006
HCM Control Delay (s)	19.8	7.5	-	-	9.4	-	-	15.4
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0










HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	624	77	47	162	2	0	0	16	11	0	7
Future Vol, veh/h	3	624	77	47	162	2	0	0	16	11	0	7
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	3	657	81	49	171	2	0	0	17	12	0	7







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	175	0	0	739	0	0	-	-	698	977	-	200
Stage 1	-	-	-	-	-	-	-	-	-	273	-	-
Stage 2	-	-	-	-	-	-	-	-	-	704	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	1414	-	-	876	-	-	0	0	444	232	0	846
Stage 1	-	-	-	-	-	-	0	0	-	737	0	-
Stage 2	-	-	-	-	-	-	0	0	-	431	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1383	-	-	876	-	-	-	-	444	213	-	826
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	213	-	-
Stage 1	-	-	-	-	-	-	-	-	-	734	-	-
Stage 2	-	-	-	-	-	-	-	-	-	414	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.1	13.4	17.7
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	444	1383	-	-	876	-	-	213	826
HCM Lane V/C Ratio	0.038	0.002	-	-	0.056	-	-	0.054	0.009
HCM Control Delay (s)	13.4	7.6	-	-	9.4	-	-	22.9	9.4
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.2	-	-	0.2	0

Intersection

Intersection Delay, s/veh	86.3
Intersection LOS	F

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	609	15	50	436	76
Future Vol, veh/h	59	609	15	50	436	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	64	662	16	54	474	83
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	123.9	10.7	46.8
HCM LOS	F	B	E

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	59	609	15	50	436	76
LT Vol	59	0	0	0	436	0
Through Vol	0	609	15	0	0	0
RT Vol	0	0	0	50	0	76
Lane Flow Rate	64	662	16	54	474	83
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.127	1.215	0.034	0.103	0.932	0.135
Departure Headway (Hd)	7.117	6.608	7.91	7.183	7.543	6.328
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	507	556	455	502	483	570
Service Time	4.823	4.313	5.61	4.883	5.243	4.028
HCM Lane V/C Ratio	0.126	1.191	0.035	0.108	0.981	0.146
HCM Control Delay	10.9	134.9	10.9	10.7	53.2	10
HCM Lane LOS	B	F	B	B	F	A
HCM 95th-tile Q	0.4	24.7	0.1	0.3	11	0.5

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5

Timing Plan: AM

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	5	5	2	1	0	1	17	54	205	287	790	9
Future Vol, veh/h	5	5	2	1	0	1	17	54	205	287	790	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	5	2	1	0	1	18	59	223	312	859	10






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1696	1806	864	1698	1699	170	868	0	0	282	0	0
Stage 1	1488	1488	-	207	207	-	-	-	-	-	-	-
Stage 2	208	318	-	1491	1492	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	74	80	357	74	93	879	785	-	-	1292	-	-
Stage 1	156	189	-	800	734	-	-	-	-	-	-	-
Stage 2	799	657	-	156	189	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	59	59	357	55	69	879	785	-	-	1292	-	-
Mov Cap-2 Maneuver	59	59	-	55	69	-	-	-	-	-	-	-
Stage 1	152	143	-	782	717	-	-	-	-	-	-	-
Stage 2	780	642	-	113	143	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	69	40.4	0.6	2.3
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	785	-	-	69	104	1292	-
HCM Lane V/C Ratio	0.024	-	-	0.189	0.021	0.241	-
HCM Control Delay (s)	9.7	-	-	69	40.4	8.7	-
HCM Lane LOS	A	-	-	F	E	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	0.9	-






HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	8	5	241	788	5
Future Vol, veh/h	33	8	5	241	788	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	36	9	5	262	857	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1132	859	862	0	-	0
Stage 1	859	-	-	-	-	-
Stage 2	273	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	227	359	789	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	778	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	226	359	789	-	-	-
Mov Cap-2 Maneuver	226	-	-	-	-	-
Stage 1	418	-	-	-	-	-
Stage 2	773	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	23	0.2		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	789	-	244	-	-	
HCM Lane V/C Ratio	0.007	-	0.183	-	-	
HCM Control Delay (s)	9.6	-	23	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.7	-	-	

HCM 2010 TWSC  
7: Lake Drive & Garage/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: AM








Intersection						
Int Delay, s/veh	2.9					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	4	242	266	348	446
Future Vol, veh/h	1	4	242	266	348	446
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	4	263	289	378	485
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1649	408	0	0	552	0
Stage 1	408	-	-	-	-	-
Stage 2	1241	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	110	648	-	-	1028	-
Stage 1	676	-	-	-	-	-
Stage 2	275	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	70	648	-	-	1028	-
Mov Cap-2 Maneuver	70	-	-	-	-	-
Stage 1	676	-	-	-	-	-
Stage 2	174	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	19.9	0	4.6			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 70 648 1028				-
HCM Lane V/C Ratio	-	- 0.016 0.007 0.368				-
HCM Control Delay (s)	-	- 57.2 10.6 10.5				-
HCM Lane LOS	-	- F B B				-
HCM 95th %tile Q(veh)	-	- 0 0 1.7				-

HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	2	145	1	0	13	106	478	24	156	54	236
Future Vol, veh/h	19	2	145	1	0	13	106	478	24	156	54	236
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	21	2	158	1	0	14	115	520	26	170	59	257

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1296	1302	187	1369	1417	533	315	0	0	546	0	0
Stage 1	526	526	-	763	763	-	-	-	-	-	-	-
Stage 2	770	776	-	606	654	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	140	162	860	125	138	551	1257	-	-	1033	-	-
Stage 1	539	532	-	400	416	-	-	-	-	-	-	-
Stage 2	396	410	-	487	466	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	111	123	860	82	105	551	1257	-	-	1033	-	-
Mov Cap-2 Maneuver	111	123	-	82	105	-	-	-	-	-	-	-
Stage 1	490	444	-	363	378	-	-	-	-	-	-	-
Stage 2	351	372	-	331	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.6	14.6	1.4	3.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1257	-	-	111	795	391	1033	-	-
HCM Lane V/C Ratio	0.092	-	-	0.186	0.201	0.039	0.164	-	-
HCM Control Delay (s)	8.2	-	-	44.7	10.7	14.6	9.2	-	-
HCM Lane LOS	A	-	-	E	B	B	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.6	0.7	0.1	0.6	-	-

# MOVEMENT SUMMARY

 **Site: [9. 62nd & Lake - 2026 AM With Project]**

Costco Buildings 4 and 5  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: SE 62nd St											
6	T1	625	1.0	0.856	3.8	LOS A	20.7	522.8	0.07	0.40	38.0
16	R2	626	1.0	0.856	3.9	LOS A	20.7	522.8	0.07	0.40	36.7
Approach		1251	1.0	0.856	3.9	LOS A	20.7	522.8	0.07	0.40	37.3
North: Lake Dr											
7	L2	126	1.0	0.213	12.8	LOS B	1.2	29.5	0.61	0.75	34.5
14	R2	83	1.0	0.213	6.9	LOS A	1.2	29.5	0.61	0.75	33.5
Approach		209	1.0	0.213	10.4	LOS B	1.2	29.5	0.61	0.75	34.1
West: Lake Dr											
5	L2	1	1.0	0.009	10.1	LOS B	0.0	1.0	0.26	0.41	37.1
2	T1	10	1.0	0.009	4.2	LOS A	0.0	1.0	0.26	0.41	37.0
Approach		11	1.0	0.009	4.7	LOS A	0.0	1.0	0.26	0.41	37.0
All Vehicles		1472	1.0	0.856	4.8	LOS A	20.7	522.8	0.15	0.45	36.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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2026 62nd & Lake RAB.sip7

DETAILED OUTPUT

 Site: [9. 62nd & Lake - 2026 AM With Project]

Costco Buildings 4 and 5  
Roundabout

OUTPUT TABLE LINKS

-  Roundabouts
  - Roundabout Basic Parameters
  - Roundabout Circulating / Exiting Stream Parameters
  - Roundabout Gap Acceptance Parameters
  - Roundabout Flow Rates
-  Movements
  - Intersection Negotiation and Travel Data
  - Movement Capacity and Performance Parameters
  - Fuel Consumption, Emissions and Cost
-  Lanes
  - Lane Performance and Capacity Information
  - Lane, Approach and Intersection Performance
  - Driver Characteristics
  - Lane Delays
  - Lane Queues
  - Lane Queue Percentiles
  - Lane Stops
-  Flow Rates
  - Origin-Destination Flow Rates (Total)
  - Origin-Destination Flow Rates by Movement Class
  - Lane Flow Rates
-  Other
  - Parameter Settings Summary
  - Diagnostics

Roundabouts

Roundabout Basic Parameters  
Site: 9. 62nd & Lake - 2026 AM With Project

Site ID: Roundabout												
Central Island Diam ft	Circ Width ft	Insc Diam. ft	Entry Radius ft	Entry Angle deg	Circ Lanes	Entry Lanes	Av.Entry Lane Width ft	Appr Dist ft	Prop Upstr	Queued Signal	Extra Bunching %	
East: SE 62nd St												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
North: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
West: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
Roundabout Capacity Model: SIDRA Standard												
NA Not Applicable (single Site analysis or unconnected Site in Network analysis).												
N Program option resulted in zero value (single Site analysis or unconnected Site in Network analysis).												

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Roundabout Circulating / Exiting Stream Parameters  
Site: 9. 62nd & Lake - 2026 AM With Project



Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	Opng Flow veh/h	HVE pcu/veh	Adj. Flow pcu/h	%Near Lane Only	%Exit Flow Incl.	Cap. Const. Effect	O-D Factor	Aver Speed mph	In-Bunch Headway sec	Prop. Bunched
East: SE 62nd St													
W	T1	1	Dominant	1	1.01	1	0.0	0.0	N	1.000	15.6	2.00	0.001
N	R2	1	Dominant	1	1.01	1	0.0	0.0	N	1.000	15.6	2.00	0.001
North: Lake Dr													
E	L2	1	Dominant	625	1.01	631	0.0	0.0	N	0.986	24.6	2.00	0.543
W	R2	1	Dominant	625	1.01	631	0.0	0.0	N	0.986	24.6	2.00	0.543
West: Lake Dr													
N	L2	1	Dominant	126	1.01	127	0.0	0.0	N	0.978	15.6	2.00	0.143
E	T1	1	Dominant	126	1.01	127	0.0	0.0	N	0.978	15.6	2.00	0.143
Roundabout Capacity Model: SIDRA Standard													

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### Roundabout Gap Acceptance Parameters Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	In-Bunch Headway sec	Prop. Bunched	Priority Sharing	HVE for Entry	Critical Gap		Follow-up Headway sec
								Headway sec	Dist ft	
East: SE 62nd St										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
W	T1	1	Dominant	2.00	0.001	Y	1.01	4.34	99.1	2.46
N	R2	1	Dominant	2.00	0.001	Y	1.01	4.34	99.1	2.46
North: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
E	L2	1	Dominant	2.00	0.543	Y	1.01	3.48	125.7	2.22
W	R2	1	Dominant	2.00	0.543	Y	1.01	3.48	125.7	2.22
West: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
N	L2	1	Dominant	2.00	0.143	Y	1.01	4.15	94.7	2.41
E	T1	1	Dominant	2.00	0.143	Y	1.01	4.15	94.7	2.41

Roundabout Capacity Model: SIDRA Standard  
Priority sharing means Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

[Go to Table Links \(Top\)](#)

### Roundabout Flow Rates Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### CIRCULATING LANE FLOW RATES

Lane No.	Circulating Flow Rate veh/h	pcu/h	Percent
East: SE 62nd St			
1	1	1	100.0%

Total	1	1	
-----			
North: Lake Dr			
1	625	631	100.0%
Total	625	631	
-----			
West: Lake Dr			
1	126	127	100.0%
Total	126	127	
-----			
The SIDRA Standard roundabout capacity model option is in use.			
This model takes into account the total circulating flow as well as the effect			
of flow distribution in circulating lanes on the entry capacity results.			
APPROACH LANE FLOW RATES			
-----			
Lane	Approach Flows (veh/h)		
No.	Out	To Downst	Total
-----			
East: SE 62nd St			
1	626	625	1251
Total	626	625	1251
-----			
North: Lake Dr			
1	83	126	209
Total	83	126	209
-----			
West: Lake Dr			
1	10	1	11
Total	10	1	11
-----			

[Go to Table Links \(Top\)](#)

## Movements

### Intersection Negotiation and Travel Data

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### TRAVEL SPEED, TRAVEL DISTANCE AND TRAVEL TIME

From Approach	To Exit	Turn	Running Speed mph	Travel Speed mph	Travel Distance ft	Travel Time s	Total Dem Flows veh-mi/h	Travel Arv Flows veh-mi/h	Tot.Trav. Time veh-h/h
-----									
East: SE 62nd St									
	West	T1	38.0	38.0	3294.2#	59.2#	389.9	389.9	10.3
	North	R2	36.7	36.7	3294.2#	61.1#	390.6	390.6	10.6
-----									
North: Lake Dr									
	East	L2	34.8	34.5	3358.6#	66.3#	80.2	80.2	2.3
	West	R2	33.7	33.5	3358.6#	68.4#	53.0	53.0	1.6
-----									
West: Lake Dr									
	North	L2	37.1	37.1	3342.9#	61.5#	0.7	0.7	0.0
	East	T1	37.0	37.0	3342.9#	61.7#	6.6	6.6	0.2
-----									
ALL VEHICLES:			36.9	36.8	3303.7#	61.1#	921.0	921.0	25.0
-----									

"Running Speed" is the average speed excluding stopped periods.

Travel Time values include cruise times and intersection delays including acceleration, deceleration and idling delays.

# Travel Distance and Travel Time values include travel on the External Exit section based on the Exit Distance or user-specified Downstream Distance value as applicable.

#### INTERSECTION NEGOTIATION DATA

From Approach	To Exit	Turn	Negn Radius ft	Negn Speed mph	Negn Dist. ft	Appr. Dist. ft	Exit Dist. ft	Downstr. Dist. ft
-----								
East: SE 62nd St								
	West	T1	194.9	24.6	134.4	1600	488	NA
	North	R2	119.4	20.5	54.0	1600	488	NA
-----								
North: Lake Dr								
	East	L2	58.0	15.6	227.8	1600	488	NA
	West	R2	119.4	20.5	54.0	1600	488	NA
-----								
West: Lake Dr								
	North	L2	58.0	15.6	227.8	1600	488	NA
	East	T1	194.9	24.6	134.4	1600	488	NA
-----								

Maximum Negotiation (Design) Speed = 30.0 mph

NA Downstream Distance does not apply if:

- Exit is an internal leg of a network
- "Program" option was specified
- Distance specified was less than the Exit Negotiation Distance
- Distance specified was greater than the exit leg length

#### MOVEMENT SPEEDS AND GEOMETRIC DELAY

		App. Speeds		Exit Speeds		Queue	Geom Delay sec
Mov		Cruise	Negn	Negn	Cruise	Move-up	
ID	Turn	mph	mph	mph	mph	Speed mph	
East: SE 62nd St							
6	T1	40.0	24.6	24.6	40.0	36.3	3.8
16	R2	40.0	20.5	20.5	40.0	36.3	3.9
North: Lake Dr							
7	L2	40.0	15.6	15.6	40.0	21.9	9.7
14	R2	40.0	20.5	20.5	40.0	21.9	3.9
West: Lake Dr							
5	L2	40.0	15.6	15.6	40.0	38.3	9.7
2	T1	40.0	24.6	24.6	40.0	38.3	3.8

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#### Movement Capacity and Performance Parameters

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### MOVEMENT CAPACITY PARAMETERS

Mov ID	Turn	Mov Cl.	Arv Flow veh/h	Opng Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Deg. Satn x
-----									
East: SE 62nd St									
6	T1	#	625	1	1	730	0.85	-1	0.856*
16	R2	#	626	1	1	731	0.85	-1	0.856*
-----									
North: Lake Dr									
7	L2	#	126	625	631	591	0.85	299	0.213
14	R2	#	83	625	631	391	0.85	299	0.213
-----									
West: Lake Dr									
5	L2	#	1	126	127	119	0.85	9645	0.009
2	T1	#	10	126	127	1194	0.85	9645	0.009
-----									

\* Maximum degree of saturation

# Combined Movement Capacity parameters are shown for all Movement Classes.

## MOVEMENT PERFORMANCE

Mov ID	Turn	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-mi/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (mph)
East: SE 62nd St										
6	T1	0.66	0.80	3.8	0.40	248.0	28.49	389.9	10.3	38.0
16	R2	0.68	0.81	3.9	0.40	248.4	28.52	390.6	10.6	36.7
North: Lake Dr										
7	L2	0.45	0.54	12.8	0.75	94.2	3.92	80.2	2.3	34.5
14	R2	0.16	0.19	6.9	0.75	62.3	2.77	53.0	1.6	33.5
West: Lake Dr										
5	L2	0.00	0.00	10.1	0.41	0.4	0.06	0.7	0.0	37.1
2	T1	0.01	0.01	4.2	0.41	4.2	0.23	6.6	0.2	37.0

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## Fuel Consumption, Emissions and Cost

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

## FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov ID	Turn	Cost Total \$/h	Fuel Total gal/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
East: SE 62nd St							
6	T1	135.81	13.5	120.0	0.16	0.010	0.092
16	R2	136.04	13.5	120.2	0.16	0.011	0.092
		271.85	26.9	240.2	0.32	0.021	0.184
North: Lake Dr							
7	L2	35.62	3.2	28.6	0.04	0.003	0.022
14	R2	23.55	2.1	18.9	0.02	0.002	0.015
		59.17	5.3	47.4	0.06	0.004	0.037
West: Lake Dr							
5	L2	0.24	0.0	0.2	0.00	0.000	0.000
2	T1	2.37	0.2	2.0	0.00	0.000	0.002
		2.61	0.3	2.3	0.00	0.000	0.002
INTERSECTION:		333.63	32.5	289.9	0.38	0.025	0.223

## FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov ID	Turn	Cost Rate \$/mi	Fuel Eff. mpg	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
East: SE 62nd St							
6	T1	0.22	29.0	191.2	0.26	0.017	0.146
16	R2	0.22	29.0	191.2	0.26	0.017	0.146
		0.22	29.0	191.2	0.26	0.017	0.146
North: Lake Dr							
7	L2	0.28	25.0	221.3	0.28	0.020	0.174
14	R2	0.28	25.0	221.3	0.28	0.020	0.174
		0.28	25.0	221.3	0.28	0.020	0.174
West: Lake Dr							
5	L2	0.22	28.7	193.0	0.26	0.017	0.148
2	T1	0.22	28.7	193.0	0.26	0.017	0.148

	0.22	28.7	193.0	0.26	0.017	0.148
INTERSECTION:	0.23	28.3	195.6	0.26	0.017	0.150

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## Lanes

### Lane Performance and Capacity Information Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### LANE PERFORMANCE

Lane No.	Flow veh/h	Cap veh/h	Deg. Satn x	Aver. Delay sec	Eff. Stop Rate	Q u e u e 95% Back		Lane Length ft
East: SE 62nd St 1	1251	1461	0.856	3.9	0.40	20.7	522.8	1600.0
North: Lake Dr 1	209	982	0.213	10.4	0.75	1.2	29.5	1600.0
West: Lake Dr 1	11	1314	0.009	4.7	0.41	0.0	1.0	1600.0

#### LANE FLOW AND CAPACITY INFORMATION

Lane No.	Total Arv Flow (veh/h)	Min Cap veh/h	Tot Cap veh/h	Deg. Satn x	Lane Util %
East: SE 62nd St 1	1251	150	1461	0.856	100
North: Lake Dr 1	209	150	982	0.213	100
West: Lake Dr 1	11	11	1314	0.009	100

The capacity values of Continuous Lanes are obtained by adjusting the basic saturation flow for lane width, grade, movement class and turning vehicle effects. Saturation flow scale applies if specified.

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### Lane, Approach and Intersection Performance Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

Lane No.	Arrival Flow (veh/h)	%HV	Adj. Basic Satf.	Deg Sat x	Aver. Delay sec	Longest Queue ft	Lane Length ft
East: SE 62nd St 1	1251	1		0.856	3.9	523	1600
	1251	1		0.856	3.9	523	
North: Lake Dr 1	209	1		0.213	10.4	29	1600

-----						
	209	1	0.213	10.4	29	
-----						
West: Lake Dr	11	1	0.009	4.7	1	1600
1	-----					
	11	1	0.009	4.7	1	
=====						
ALL VEHICLES						
Total	%		Max	Aver.	Max	
Flow	HV		X	Delay	Queue	
1472	1		0.856	4.8	523	
=====						
Peak flow period = 15 minutes.						
Queue values in this table are 95% queue (feet)						
Note: Basic Saturation Flows at roundabouts or sign-controlled						
intersections apply only to continuous lanes.						

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### Driver Characteristics

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

-----						
Lane No.	Satn Speed mph	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing ft	Average Queue Space ft	Driver Response Time sec
-----						
East: SE 62nd St						
1	22.5	1463	2.46	81.38	25.20	1.70
-----						
North: Lake Dr						
1	17.5	1620	2.22	57.10	25.20	1.24
-----						
West: Lake Dr						
1	23.8	1492	2.41	84.27	25.20	1.69
-----						

Saturation Flow and Saturation Headway are derived from follow-up headway.

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### Lane Delays

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### LANE DELAYS

-----												
				Delay (seconds/veh)								
Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Stop-line 1st d1	Delay 2nd d2	Total dSL	Acc. Dec. dn	Queuing dq	Stopd dqm	(Idle) di	Geom dig	Control dic
-----												
East: SE 62nd St												
1	0.856	NA	NA	0.0	0.0	0.0	0.4	0.0	0.0	0.0	3.8	3.9
-----												
North: Lake Dr												
1	0.213	NA	NA	3.0	0.0	3.0	2.5	0.5	0.0	0.5	7.4	10.4
-----												
West: Lake Dr												
1	0.009	NA	NA	0.4	0.0	0.4	1.6	0.0	0.0	0.0	4.3	4.7
-----												

SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay.

dSL: Stop-line delay (=d1+d2)

dn: Average stop-start delay for all vehicles queued and unqueued

dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay)

dqm: Queue move-up delay

di: Stopped delay (stopped (idling) time at near-zero speed)

dig: Geometric delay  
dic: Control delay

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### Lane Queues

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### LANE QUEUES (VEHICLES)

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (veh)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
	x				Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: SE 62nd St														
1	0.856	NA	NA	0.0	8.3	0.0	8.3	20.7	0.13	0.33	0.0	NA	0.0	0.0
North: Lake Dr														
1	0.213	NA	NA	0.0	0.5	0.0	0.5	1.2	0.01	0.02	0.0	NA	0.2	0.3
West: Lake Dr														
1	0.009	NA	NA	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	NA	0.0	0.0

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUES (DISTANCE)

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (ft)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
					Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: SE 62nd St														
1	0.856	NA	NA	0.0	210.4	0.0	210.4	522.8	0.13	0.33	0.0	NA	0.2	0.4
North: Lake Dr														
1	0.213	NA	NA	0.0	11.9	0.0	11.9	29.5	0.01	0.02	0.0	NA	4.5	8.1
West: Lake Dr														
1	0.009	NA	NA	0.0	0.4	0.0	0.4	1.0	0.00	0.00	0.0	NA	0.0	0.1

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

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### Lane Queue Percentiles

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### LANE QUEUE PERCENTILES (VEHICLES)

Lane No.	Deg. Satn	Percentile Back of Queue (veh)						
	x	50%	70%	85%	90%	95%	98%	100%
East: SE 62nd St								
1	0.856	8.3	10.8	15.2	17.6	20.7	23.0	24.8
North: Lake Dr								
1	0.213	0.5	0.6	0.9	1.0	1.2	1.3	1.4
West: Lake Dr								
1	0.009	0.0	0.0	0.0	0.0	0.0	0.0	0.0

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUE PERCENTILES (DISTANCE)

Lane No.	Deg. Satn x	Percentile Back of Queue (feet)						
		50%	70%	85%	90%	95%	98%	100%
East: SE 62nd St								
1	0.856	210.3	272.4	384.0	444.6	522.8	580.3	623.8
North: Lake Dr								
1	0.213	11.9	15.4	21.6	25.1	29.5	32.7	35.2
West: Lake Dr								
1	0.009	0.4	0.5	0.8	0.9	1.0	1.2	1.2

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

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### Lane Stops

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	-- Effective Stop Rate --		Geom. Overall h	Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq	Aver. Num. of Cycles to Depart	
	x			he1	he2							
East: SE 62nd St												
1	0.856	NA	NA	0.01	0.00	0.39	0.40	496.4	0.00	0.0	0.07	0.07
North: Lake Dr												
1	0.213	NA	NA	0.51	0.00	0.24	0.75	156.4	0.00	0.0	0.61	0.61
West: Lake Dr												
1	0.009	NA	NA	0.10	0.00	0.31	0.41	4.7	0.00	0.0	0.26	0.26

hig is the average value for all movements in a shared lane  
hqm is average queue move-up rate for all vehicles queued and unqueued

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### Flow Rates

Origin-Destination Flow Rates (Total)

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### TOTAL FLOW RATES for All Movement Classes (veh/h)

From EAST To:			
Turn:	W	N	TOT
Flow Rate	625.0	626.0	1251.0
%HV (all designations)	1.0	1.0	1.0
From NORTH To:			
Turn:	E	W	TOT
Flow Rate	126.0	83.3	209.4
%HV (all designations)	1.0	1.0	1.0
From WEST To:			
Turn:	N	E	TOT
Flow Rate	1.0	10.4	11.5



%HV (all designations)	1.0	1.0	1.0
------------------------	-----	-----	-----

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

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## Origin-Destination Flow Rates by Movement Class

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

### FLOW RATES for Light Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	618.8	619.8	1238.5
Mov Class %	99.0	99.0	99.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.96	0.96	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	124.8	82.5	207.3
Mov Class %	99.0	99.0	99.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.96	0.96	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	1.0	10.3	11.3
Mov Class %	99.0	99.0	99.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.96	0.96	-
Residual Demand	0.0	0.0	0.0

### FLOW RATES for Heavy Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	6.2	6.3	12.5
Mov Class %	1.0	1.0	1.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.96	0.96	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	1.3	0.8	2.1
Mov Class %	1.0	1.0	1.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.96	0.96	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	0.0	0.1	0.1
Mov Class %	1.0	1.0	1.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.96	0.96	-
Residual Demand	0.0	0.0	0.0

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Lane Flow Rates

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
 Roundabout

### LANE FLOW RATES AT STOP LINE (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Lane 1			
LV	618.8	619.8	1238.5
HV	6.2	6.3	12.5
Total	625.0	626.0	1251.0
Approach	625.0	626.0	1251.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Lane 1			
LV	124.8	82.5	207.3
HV	1.3	0.8	2.1
Total	126.0	83.3	209.4
Approach	126.0	83.3	209.4
From WEST To:	N	E	
Turn:	L2	T1	TOT
Lane 1			
LV	1.0	10.3	11.3
HV	0.0	0.1	0.1
Total	1.0	10.4	11.5
Approach	1.0	10.4	11.5

### EXIT LANE FLOW RATES

Movement Class:	LV	HV	TOT
Exit: EAST			
Lane: 1	135.1	1.4	136.5
Total	135.1	1.4	136.5
Exit: NORTH			
Lane: 1	620.8	6.3	627.1
Total	620.8	6.3	627.1
Exit: WEST			
Lane: 1	701.2	7.1	708.3
Total	701.2	7.1	708.3

### DOWNSTREAM LANE FLOW RATES FOR EXIT ROADS

Movement Class:	LV	HV	TOT
Exit: EAST			
Lane: 1	135.1	1.4	136.5
Total	135.1	1.4	136.5

Exit: NORTH			
Lane: 1	620.8	6.3	627.1
Total	620.8	6.3	627.1
-----			
Exit: WEST			
Lane: 1	701.2	7.1	708.3
Total	701.2	7.1	708.3
-----			

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
Unit Time for Volumes = 60 minutes  
Peak Flow Period = 15 minutes  
Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Other

### Parameter Settings Summary

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

\* Basic Parameters:  
Intersection Type: Roundabout  
Driving on the right-hand side of the road  
Input data specified in US units  
Model Defaults: US HCM (Customary)  
Peak Flow Period (for performance): 15 minutes  
Unit time (for volumes): 60 minutes.  
SIDRA Standard Delay model used  
HCM Queue Model option used  
Level of Service based on: Delay and v/c (HCM 2010)  
Queue percentile: 95%

[Go to Table Links \(Top\)](#)

### Diagnostics

Site: 9. 62nd & Lake - 2026 AM With Project

Site ID:  
Roundabout

#### Flow-Capacity Iterations:

Largest change in degree of saturation for any lane = 0.1 %  
Largest change in capacity for any lane = 1 veh/h

Other Diagnostic Messages (if any):

[Go to Table Links \(Top\)](#)

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Organisation: TRANSPORTATION SOLUTIONS INC | Processed: Thursday, March 15, 2018 8:52:36 AM

Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22

Comment Response\2026 62nd & Lake RAB.sip7

Intersection

Int Delay, s/veh 4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	331	5	20	660	10	60
Future Vol, veh/h	331	5	20	660	10	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	360	5	22	717	11	65

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	739	0	0 1105 380
Stage 1	-	-	- - 380 -
Stage 2	-	-	- - 725 -
Critical Hdwy	4.1	-	- - 6.4 6.2
Critical Hdwy Stg 1	-	-	- - 5.4 -
Critical Hdwy Stg 2	-	-	- - 5.4 -
Follow-up Hdwy	2.2	-	- - 3.5 3.3
Pot Cap-1 Maneuver	876	-	- - 235 671
Stage 1	-	-	- - 696 -
Stage 2	-	-	- - 483 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	876	-	- - 138 671
Mov Cap-2 Maneuver	-	-	- - 138 -
Stage 1	-	-	- - 696 -
Stage 2	-	-	- - 284 -

Approach	EB	WB	SB
HCM Control Delay, s	11.8	0	14.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	876	-	-	-	138	671
HCM Lane V/C Ratio	0.411	-	-	-	0.079	0.097
HCM Control Delay (s)	11.9	0	-	-	33.3	10.9
HCM Lane LOS	B	A	-	-	D	B
HCM 95th %tile Q(veh)	2	-	-	-	0.3	0.3

Intersection: 1: 11th Ave NW/11th Ave & Lake Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	57	229	66	48	36	31	266	249
Average Queue (ft)	2	133	33	30	11	4	138	63
95th Queue (ft)	22	244	57	47	35	22	273	218
Link Distance (ft)		200	302		171	171	250	250
Upstream Blk Time (%)		24					16	5
Queuing Penalty (veh)		0					0	0
Storage Bay Dist (ft)	100			75				
Storage Blk Time (%)		38	0					
Queuing Penalty (veh)		1	0					

Intersection: 2: West Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	L	LTR	LTR
Maximum Queue (ft)	65	308	41	97	27
Average Queue (ft)	1	153	8	30	2
95th Queue (ft)	30	389	32	78	13
Link Distance (ft)		302		96	102
Upstream Blk Time (%)		5		9	
Queuing Penalty (veh)		34		0	
Storage Bay Dist (ft)	160		70		
Storage Blk Time (%)		42	0		
Queuing Penalty (veh)		1	0		

Intersection: 3: Building 2 Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	R	L	R
Maximum Queue (ft)	72	206	49	30	82	72	27
Average Queue (ft)	4	130	15	2	26	21	6
95th Queue (ft)	37	270	41	16	72	64	25
Link Distance (ft)		189		326	83	108	108
Upstream Blk Time (%)		15			8	2	
Queuing Penalty (veh)		108			0	0	
Storage Bay Dist (ft)	70		50				
Storage Blk Time (%)		56	0	0			
Queuing Penalty (veh)		2	1	0			

Intersection: 4: Lake Drive & 10th Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	100	336	38	54	232	169
Average Queue (ft)	76	287	12	27	129	39
95th Queue (ft)	142	420	37	49	226	123
Link Distance (ft)		326	211		217	217
Upstream Blk Time (%)		14			8	2
Queuing Penalty (veh)		90			0	0
Storage Bay Dist (ft)	50			50		
Storage Blk Time (%)	1	91	0	0		
Queuing Penalty (veh)	5	54	0	0		

Intersection: 5: Lake Drive & Building 1 Driveway/Garage Driveway

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	37	21	33	21	72
Average Queue (ft)	10	2	8	3	37
95th Queue (ft)	33	13	30	15	63
Link Distance (ft)	76	87		378	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			50		75
Storage Blk Time (%)			0	0	0
Queuing Penalty (veh)			0	0	1

Intersection: 6: Lake Drive & Building 3 Driveway

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	68	31	88
Average Queue (ft)	29	4	4
95th Queue (ft)	59	20	44
Link Distance (ft)	99		378
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 7: Lake Drive & Garage/Trading Building Driveway

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	11	28	49	74	146
Average Queue (ft)	0	3	16	56	20
95th Queue (ft)	6	16	40	77	92
Link Distance (ft)	124	124	163		117
Upstream Blk Time (%)					1
Queuing Penalty (veh)					8
Storage Bay Dist (ft)				50	
Storage Blk Time (%)				13	
Queuing Penalty (veh)				58	

Intersection: 8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Movement	EB	EB	WB	NB	NB	SB	SB
Directions Served	L	TR	LTR	L	TR	L	TR
Maximum Queue (ft)	40	86	33	56	19	74	45
Average Queue (ft)	12	40	10	23	1	33	4
95th Queue (ft)	37	67	32	52	10	61	22
Link Distance (ft)	96	96	85		294		163
Upstream Blk Time (%)		0					
Queuing Penalty (veh)		0					
Storage Bay Dist (ft)				50		50	
Storage Blk Time (%)				0	0	2	0
Queuing Penalty (veh)				2	0	5	0

Intersection: 10: 62nd St & Lot 5 Driveway

Movement	EB	WB	SB	SB
Directions Served	LT	TR	L	R
Maximum Queue (ft)	214	83	66	56
Average Queue (ft)	125	39	14	28
95th Queue (ft)	223	74	48	49
Link Distance (ft)	199	145	102	102
Upstream Blk Time (%)	9		0	
Queuing Penalty (veh)	0		0	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 369

Intersection

Intersection Delay, s/veh	24.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱		↰↱			↰↱	
Traffic Vol, veh/h	103	164	64	17	358	325	178	199	26	15	24	72
Future Vol, veh/h	103	164	64	17	358	325	178	199	26	15	24	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	112	178	70	18	389	353	193	216	28	16	26	78
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0







Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	17.6	30.1	23.2	13.1
HCM LOS	C	D	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	64%	0%	100%	0%	5%	0%	56%	0%
Vol Thru, %	36%	79%	0%	72%	95%	0%	44%	14%
Vol Right, %	0%	21%	0%	28%	0%	100%	0%	86%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	278	126	103	228	375	325	27	84
LT Vol	178	0	103	0	17	0	15	0
Through Vol	100	100	0	164	358	0	12	12
RT Vol	0	26	0	64	0	325	0	72
Lane Flow Rate	302	136	112	248	408	353	29	91
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.689	0.296	0.262	0.533	0.837	0.654	0.074	0.209
Departure Headway (Hd)	8.229	7.803	8.438	7.738	7.388	6.665	9.081	8.257
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	440	460	425	466	489	540	394	434
Service Time	5.985	5.558	6.201	5.5	5.144	4.42	6.852	6.027
HCM Lane V/C Ratio	0.686	0.296	0.264	0.532	0.834	0.654	0.074	0.21
HCM Control Delay	27.4	13.8	14.2	19.1	37.9	21.2	12.6	13.2
HCM Lane LOS	D	B	B	C	E	C	B	B
HCM 95th-tile Q	5.1	1.2	1	3.1	8.3	4.7	0.2	0.8



HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	159	18	39	582	61	56	1	10	42	1	62
Future Vol, veh/h	29	159	18	39	582	61	56	1	10	42	1	62
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	31	171	19	42	626	66	60	1	11	45	1	67








Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	694	0	0	201	0	0	1030	1032	192	994	1009	662
Stage 1	-	-	-	-	-	-	254	254	-	745	745	-
Stage 2	-	-	-	-	-	-	776	778	-	249	264	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	911	-	-	1383	-	-	214	232	855	226	242	465
Stage 1	-	-	-	-	-	-	755	695	-	409	424	-
Stage 2	-	-	-	-	-	-	393	405	-	759	694	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	911	-	-	1383	-	-	172	215	847	211	224	464
Mov Cap-2 Maneuver	-	-	-	-	-	-	172	215	-	211	224	-
Stage 1	-	-	-	-	-	-	723	665	-	394	410	-
Stage 2	-	-	-	-	-	-	325	392	-	723	664	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.3	0.4	33.7	23
HCM LOS			D	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	196	911	-	-	1383	-	-	311
HCM Lane V/C Ratio	0.368	0.034	-	-	0.03	-	-	0.363
HCM Control Delay (s)	33.7	9.1	-	-	7.7	-	-	23
HCM Lane LOS	D	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	1.6	0.1	-	-	0.1	-	-	1.6

HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	5.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	166	10	33	552	53	0	0	115	70	0	131
Future Vol, veh/h	36	166	10	33	552	53	0	0	115	70	0	131
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	38	175	11	35	581	56	0	0	121	74	0	138







Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	186	0	0	-	-	181	936	-	637
Stage 1	-	-	-	-	-	-	-	-	-	680	-	-
Stage 2	-	-	-	-	-	-	-	-	-	256	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	955	-	-	1401	-	-	0	0	867	247	0	481
Stage 1	-	-	-	-	-	-	0	0	-	444	0	-
Stage 2	-	-	-	-	-	-	0	0	-	753	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	934	-	-	1401	-	-	-	-	866	202	-	470
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	202	-	-
Stage 1	-	-	-	-	-	-	-	-	-	425	-	-
Stage 2	-	-	-	-	-	-	-	-	-	621	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.5			0.4			9.8			21.7		
HCM LOS							A			C		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	866	934	-	-	1401	-	-	202	470
HCM Lane V/C Ratio	0.14	0.041	-	-	0.025	-	-	0.365	0.293
HCM Control Delay (s)	9.8	9	-	-	7.6	-	-	32.7	15.8
HCM Lane LOS	A	A	-	-	A	-	-	D	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	1.6	1.2

Intersection

Intersection Delay, s/veh	15.3
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	260	103	384	414	21	131
Future Vol, veh/h	260	103	384	414	21	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	283	112	417	450	23	142
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	14.4	16.5	11.4
HCM LOS	B	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	260	103	384	414	21	131
LT Vol	260	0	0	0	21	0
Through Vol	0	103	384	0	0	0
RT Vol	0	0	0	414	0	131
Lane Flow Rate	283	112	417	450	23	142
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.515	0.188	0.649	0.611	0.049	0.256
Departure Headway (Hd)	6.558	6.051	5.595	4.887	7.701	6.479
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	551	592	647	738	465	554
Service Time	4.298	3.791	3.324	2.617	5.446	4.224
HCM Lane V/C Ratio	0.514	0.189	0.645	0.61	0.049	0.256
HCM Control Delay	16.1	10.2	18.1	15	10.8	11.5
HCM Lane LOS	C	B	C	B	B	B
HCM 95th-tile Q	2.9	0.7	4.7	4.2	0.2	1

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	58	1	12	51	9	134	19	589	1	3	101	16
Future Vol, veh/h	58	1	12	51	9	134	19	589	1	3	101	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	63	1	13	55	10	146	21	640	1	3	110	17





Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	885	808	118	814	816	641	127	0	0	641	0	0
Stage 1	125	125	-	682	682	-	-	-	-	-	-	-
Stage 2	760	683	-	132	134	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	268	317	939	299	314	478	1472	-	-	953	-	-
Stage 1	884	796	-	443	453	-	-	-	-	-	-	-
Stage 2	401	452	-	876	789	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	179	311	939	290	309	478	1472	-	-	953	-	-
Mov Cap-2 Maneuver	179	311	-	290	309	-	-	-	-	-	-	-
Stage 1	871	793	-	437	447	-	-	-	-	-	-	-
Stage 2	269	446	-	860	787	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32	23.6	0.2	0.2
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1472	-	-	209 400	953	-	-
HCM Lane V/C Ratio	0.014	-	-	0.369 0.527	0.003	-	-
HCM Control Delay (s)	7.5	-	-	32 23.6	8.8	-	-
HCM Lane LOS	A	-	-	D C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	1.6 3	0	-	-






HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	13	14	581	158	6
Future Vol, veh/h	28	13	14	581	158	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	30	14	15	632	172	7
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	837	175	178	0	-	0
Stage 1	175	-	-	-	-	-
Stage 2	662	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	339	874	1410	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	335	874	1410	-	-	-
Mov Cap-2 Maneuver	335	-	-	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	14.7		0.2		0	
HCM LOS	B					
Minor Lane/Major Mvmt	NBL		NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1410		-	416	-	-
HCM Lane V/C Ratio	0.011		-	0.107	-	-
HCM Control Delay (s)	7.6		-	14.7	-	-
HCM Lane LOS	A		-	B	-	-
HCM 95th %tile Q(veh)	0		-	0.4	-	-

HCM 2010 TWSC  
7: Lake Drive & Garage/Trading Building Driveway








Costco Buildings 4 and 5  
Timing Plan: PM

Intersection						
Int Delay, s/veh	5.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	137	190	405	6	3	168
Future Vol, veh/h	137	190	405	6	3	168
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	149	207	440	7	3	183
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	632	443	0	0	447	0
Stage 1	443	-	-	-	-	-
Stage 2	189	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	448	619	-	-	1124	-
Stage 1	651	-	-	-	-	-
Stage 2	848	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	447	619	-	-	1124	-
Mov Cap-2 Maneuver	447	-	-	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	846	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	15.1	0	0.1			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1WBLn2	SBL	SBT		
Capacity (veh/h)	-	- 447 619 1124	-	-		
HCM Lane V/C Ratio	-	- 0.333 0.334 0.003	-	-		
HCM Control Delay (s)	-	- 17 13.7 8.2	-	-		
HCM Lane LOS	-	- C B A	-	-		
HCM 95th %tile Q(veh)	-	- 1.4 1.5 0	-	-		

HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Costco Buildings 4 and 5

Timing Plan: PM

Intersection												
Int Delay, s/veh	13											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	159	0	391	30	0	37	95	215	10	5	288	12
Future Vol, veh/h	159	0	391	30	0	37	95	215	10	5	288	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	0	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	173	0	425	33	0	40	103	234	11	5	313	13

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	796	781	320	989	783	239	326	0	0	245	0	0
Stage 1	330	330	-	446	446	-	-	-	-	-	-	-
Stage 2	466	451	-	543	337	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	307	329	725	228	328	805	1245	-	-	1333	-	-
Stage 1	687	649	-	595	577	-	-	-	-	-	-	-
Stage 2	581	574	-	528	645	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	272	301	725	88	300	805	1245	-	-	1333	-	-
Mov Cap-2 Maneuver	272	301	-	88	300	-	-	-	-	-	-	-
Stage 1	630	647	-	546	529	-	-	-	-	-	-	-
Stage 2	506	527	-	218	643	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	23.1		40.1		2.4		0.1	
HCM LOS	C		E					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1245	-	-	272	725	173	1333	-	-
HCM Lane V/C Ratio	0.083	-	-	0.635	0.586	0.421	0.004	-	-
HCM Control Delay (s)	8.2	-	-	38.7	16.8	40.1	7.7	-	-
HCM Lane LOS	A	-	-	E	C	E	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	4	3.9	1.9	0	-	-

# MOVEMENT SUMMARY

 **Site: [9. 62nd & Lake - 2026 PM With Project]**

Costco Buildings 4 and 5  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: SE 62nd St											
6	T1	135	2.0	0.330	3.8	LOS A	2.5	63.9	0.07	0.42	38.0
16	R2	340	2.0	0.330	3.9	LOS A	2.5	63.9	0.07	0.42	36.7
Approach		475	2.0	0.330	3.9	LOS A	2.5	63.9	0.07	0.42	37.1
North: Lake Dr											
7	L2	757	2.0	0.585	10.7	LOS B	4.5	113.4	0.43	0.64	34.0
14	R2	14	2.0	0.585	4.9	LOS A	4.5	113.4	0.43	0.64	33.0
Approach		771	2.0	0.585	10.6	LOS B	4.5	113.4	0.43	0.64	34.0
West: Lake Dr											
5	L2	5	2.0	0.754	22.3	LOS C	10.0	253.8	0.99	1.20	31.6
2	T1	592	2.0	0.754	16.4	LOS B	10.0	253.8	0.99	1.20	31.5
Approach		598	2.0	0.754	16.4	LOS B	10.0	253.8	0.99	1.20	31.5
All Vehicles		1843	2.0	0.754	10.8	LOS B	10.0	253.8	0.52	0.76	33.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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2026 62nd & Lake RAB.sip7




DETAILED OUTPUT

 Site: [9. 62nd & Lake - 2026 PM With Project]

Costco Buildings 4 and 5  
Roundabout

OUTPUT TABLE LINKS




Roundabouts

Roundabout Basic Parameters

Roundabout Circulating / Exiting Stream Parameters

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Movements

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Lanes

Lane Performance and Capacity Information

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Driver Characteristics

Lane Delays

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Flow Rates

Origin-Destination Flow Rates (Total)

Origin-Destination Flow Rates by Movement Class

Lane Flow Rates



Other

Parameter Settings Summary

Diagnostics

Roundabouts

Roundabout Basic Parameters  
Site: 9. 62nd & Lake - 2026 PM With Project

Site ID: Roundabout												
Central Island Diam ft	Circ Width ft	Insc Diam. ft	Entry Radius ft	Entry Angle deg	Circ Lanes	Entry Lanes	Av.Entry Lane Width ft	Appr Dist ft	Prop Upstr	Queued Signal	Extra Bunching %	
East: SE 62nd St												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
North: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
West: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
Roundabout Capacity Model: SIDRA Standard												
NA Not Applicable (single Site analysis or unconnected Site in Network analysis).												
N Program option resulted in zero value (single Site analysis or unconnected Site in Network analysis).												

[Go to Table Links \(Top\)](#)

Roundabout Circulating / Exiting Stream Parameters  
Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	Opng Flow veh/h	HVE pcu/veh	Adj. Flow pcu/h	%Near Lane Only	%Exit Flow Incl.	Cap. Const. Effect	O-D Factor	Aver Speed mph	In-Bunch Headway sec	Prop. Bunched
East: SE 62nd St													
W	T1	1	Dominant	5	1.02	6	0.0	0.0	N	0.998	15.6	2.00	0.007
N	R2	1	Dominant	5	1.02	6	0.0	0.0	N	0.998	15.6	2.00	0.007
North: Lake Dr													
E	L2	1	Dominant	135	1.02	137	0.0	0.0	N	0.997	24.6	2.00	0.154
W	R2	1	Dominant	135	1.02	137	0.0	0.0	N	0.997	24.6	2.00	0.154
West: Lake Dr													
N	L2	1	Dominant	757	1.02	772	0.0	0.0	N	0.886	15.6	2.00	0.623
E	T1	1	Dominant	757	1.02	772	0.0	0.0	N	0.886	15.6	2.00	0.623
Roundabout Capacity Model: SIDRA Standard													

[Go to Table Links \(Top\)](#)

### Roundabout Gap Acceptance Parameters Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	In-Bunch Headway sec	Prop. Bunched	Priority Sharing	HVE for Entry	Critical Gap		Follow-up Headway sec
								Headway sec	Dist ft	
-----										
East: SE 62nd St										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
W	T1	1	Dominant	2.00	0.007	Y	1.02	4.38	100.0	2.48
N	R2	1	Dominant	2.00	0.007	Y	1.02	4.38	100.0	2.48
-----										
North: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
E	L2	1	Dominant	2.00	0.154	Y	1.02	4.17	150.8	2.43
W	R2	1	Dominant	2.00	0.154	Y	1.02	4.17	150.8	2.43
-----										
West: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
N	L2	1	Dominant	2.00	0.623	Y	1.02	3.36	76.6	2.19
E	T1	1	Dominant	2.00	0.623	Y	1.02	3.36	76.6	2.19

Roundabout Capacity Model: SIDRA Standard  
Priority sharing means Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

[Go to Table Links \(Top\)](#)

### Roundabout Flow Rates Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### CIRCULATING LANE FLOW RATES

Lane No.	Circulating Flow Rate veh/h	pcu/h	Percent
East: SE 62nd St			
1	5	6	100.0%

Total	5	6	
-----			
North: Lake Dr			
1	135	137	100.0%
Total	135	137	
-----			
West: Lake Dr			
1	757	772	100.0%
Total	757	772	
-----			
The SIDRA Standard roundabout capacity model option is in use.			
This model takes into account the total circulating flow as well as the effect			
of flow distribution in circulating lanes on the entry capacity results.			
APPROACH LANE FLOW RATES			
-----			
Lane	Approach Flows (veh/h)		
No.	Out	To Downst	Total
-----			
East: SE 62nd St			
1	340	135	475
Total	340	135	475
-----			
North: Lake Dr			
1	14	757	771
Total	14	757	771
-----			
West: Lake Dr			
1	592	6	598
Total	592	6	598
-----			

[Go to Table Links \(Top\)](#)

## Movements

### Intersection Negotiation and Travel Data

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### TRAVEL SPEED, TRAVEL DISTANCE AND TRAVEL TIME

From Approach	To Exit	Turn	Running Speed mph	Travel Speed mph	Travel Distance ft	Travel Time s	Total Dem Flows veh-mi/h	Travel Distance Arv Flows veh-mi/h	Tot.Trav. Time veh-h/h
-----									
East: SE 62nd St									
	West	T1	38.0	38.0	3276.8#	58.9#	83.6	83.6	2.2
	North	R2	36.7	36.7	3276.8#	60.8#	211.1	211.1	5.7
-----									
North: Lake Dr									
	East	L2	34.0	34.0	3424.6#	68.7#	490.7	490.7	14.4
	West	R2	33.0	33.0	3424.6#	70.9#	9.2	9.2	0.3
-----									
West: Lake Dr									
	North	L2	32.8	31.6	3335.3#	71.9#	3.4	3.4	0.1
	East	T1	32.7	31.5	3335.3#	72.1#	374.2	374.2	11.9
-----									
ALL VEHICLES:			34.4	33.8	3357.5#	67.7#	1172.3	1172.3	34.6
-----									

"Running Speed" is the average speed excluding stopped periods.

Travel Time values include cruise times and intersection delays including acceleration, deceleration and idling delays.

# Travel Distance and Travel Time values include travel on the External Exit section based on the Exit Distance or user-specified Downstream Distance value as applicable.

#### INTERSECTION NEGOTIATION DATA

From Approach	To Exit	Turn	Negn Radius ft	Negn Speed mph	Negn Dist. ft	Appr. Dist. ft	Exit Dist. ft	Downstr. Dist. ft
-----								
East: SE 62nd St								
	West	T1	194.9	24.6	134.4	1600	488	NA
	North	R2	119.4	20.5	54.0	1600	488	NA
-----								
North: Lake Dr								
	East	L2	58.0	15.6	227.8	1600	488	NA
	West	R2	119.4	20.5	54.0	1600	488	NA
-----								
West: Lake Dr								
	North	L2	58.0	15.6	227.8	1600	488	NA
	East	T1	194.9	24.6	134.4	1600	488	NA
-----								

Maximum Negotiation (Design) Speed = 30.0 mph

NA Downstream Distance does not apply if:

- Exit is an internal leg of a network
- "Program" option was specified
- Distance specified was less than the Exit Negotiation Distance
- Distance specified was greater than the exit leg length

#### MOVEMENT SPEEDS AND GEOMETRIC DELAY

		App. Speeds		Exit Speeds		Queue	Geom Delay sec
Mov		Cruise	Negn	Negn	Cruise	Move-up	
ID	Turn	mph	mph	mph	mph	Speed mph	
East: SE 62nd St							
6	T1	40.0	24.6	24.6	40.0	34.8	3.8
16	R2	40.0	20.5	20.5	40.0	34.8	3.9
North: Lake Dr							
7	L2	40.0	15.6	15.6	40.0	25.2	9.8
14	R2	40.0	20.5	20.5	40.0	25.2	3.9
West: Lake Dr							
5	L2	40.0	15.6	15.6	40.0	20.8	9.8
2	T1	40.0	24.6	24.6	40.0	20.8	3.8

[Go to Table Links \(Top\)](#)

#### Movement Capacity and Performance Parameters

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### MOVEMENT CAPACITY PARAMETERS

Mov ID	Turn	Mov Cl.	Arv Flow veh/h	Opng Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Deg. Satn x
-----									
East: SE 62nd St									
6	T1	#	135	5	6	408	0.85	158	0.330
16	R2	#	340	5	6	1031	0.85	158	0.330
-----									
North: Lake Dr									
7	L2	#	757	135	137	1293	0.85	45	0.585
14	R2	#	14	135	137	24	0.85	45	0.585
-----									
West: Lake Dr									
5	L2	#	5	757	772	7	0.85	13	0.754*
2	T1	#	592	757	772	786	0.85	13	0.754*
-----									

\* Maximum degree of saturation

# Combined Movement Capacity parameters are shown for all Movement Classes.

## MOVEMENT PERFORMANCE

Mov ID	Turn	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-mi/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (mph)
East: SE 62nd St										
6	T1	0.14	0.17	3.8	0.42	56.8	4.58	83.6	2.2	38.0
16	R2	0.37	0.44	3.9	0.42	143.3	8.47	211.1	5.7	36.7
North: Lake Dr										
7	L2	2.26	2.71	10.7	0.64	481.5	20.79	490.7	14.4	34.0
14	R2	0.02	0.02	4.9	0.64	9.0	3.89	9.2	0.3	33.0
West: Lake Dr										
5	L2	0.03	0.04	22.3	1.20	6.5	8.20	3.4	0.1	31.6
2	T1	2.69	3.23	16.4	1.20	711.9	24.05	374.2	11.9	31.5

[Go to Table Links \(Top\)](#)

## Fuel Consumption, Emissions and Cost

Site: 9. 62nd &amp; Lake - 2026 PM With Project

 Site ID:  
 Roundabout

## FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov ID	Turn	Cost Total \$/h	Fuel Total gal/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
East: SE 62nd St							
6	T1	29.97	3.1	27.4	0.04	0.002	0.032
16	R2	75.64	7.7	69.1	0.09	0.006	0.082
		105.61	10.8	96.5	0.13	0.008	0.114
North: Lake Dr							
7	L2	231.33	20.8	185.7	0.23	0.017	0.219
14	R2	4.32	0.4	3.5	0.00	0.000	0.004
		235.65	21.2	189.2	0.23	0.017	0.223
West: Lake Dr							
5	L2	1.55	0.1	1.3	0.00	0.000	0.002
2	T1	169.10	15.4	137.9	0.17	0.013	0.169
		170.65	15.6	139.1	0.17	0.013	0.171
INTERSECTION:		511.92	47.5	424.8	0.53	0.038	0.507

## FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov ID	Turn	Cost Rate \$/mi	Fuel Eff. mpg	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
East: SE 62nd St							
6	T1	0.22	27.3	203.5	0.26	0.018	0.240
16	R2	0.22	27.3	203.5	0.26	0.018	0.240
		0.22	27.3	203.5	0.26	0.018	0.240
North: Lake Dr							
7	L2	0.29	23.6	235.1	0.29	0.021	0.277
14	R2	0.29	23.6	235.1	0.29	0.021	0.277
		0.29	23.6	235.1	0.29	0.021	0.277
West: Lake Dr							
5	L2	0.28	24.3	228.9	0.29	0.021	0.281
2	T1	0.28	24.3	228.9	0.29	0.021	0.281

	0.28	24.3	228.9	0.29	0.021	0.281
INTERSECTION:	0.27	24.7	225.2	0.28	0.020	0.269

[Go to Table Links \(Top\)](#)

## Lanes

### Lane Performance and Capacity Information Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### LANE PERFORMANCE

Lane No.	Flow veh/h	Cap veh/h	Deg. Satn x	Aver. Delay sec	Eff. Stop Rate	Q u e u e 95% Back		Lane Length ft
East: SE 62nd St 1	475	1440	0.330	3.9	0.42	2.5	63.9	1600.0
North: Lake Dr 1	771	1317	0.585	10.6	0.64	4.5	113.4	1600.0
West: Lake Dr 1	598	793	0.754	16.4	1.20	10.0	253.8	1600.0

#### LANE FLOW AND CAPACITY INFORMATION

Lane No.	Total Arr Flow (veh/h)	Min Cap veh/h	Tot Cap veh/h	Deg. Satn x	Lane Util %
East: SE 62nd St 1	475	150	1440	0.330	100
North: Lake Dr 1	771	150	1317	0.585	100
West: Lake Dr 1	598	150	793	0.754	100

The capacity values of Continuous Lanes are obtained by adjusting the basic saturation flow for lane width, grade, movement class and turning vehicle effects. Saturation flow scale applies if specified.

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### Lane, Approach and Intersection Performance Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

Lane No.	Arrival Flow (veh/h)	%HV	Adj. Basic Satf.	Deg Sat x	Aver. Delay sec	Longest Queue ft	Lane Length ft
East: SE 62nd St 1	475	2		0.330	3.9	64	1600
	475	2		0.330	3.9	64	
North: Lake Dr 1	771	2		0.585	10.6	113	1600

	771	2	0.585	10.6	113	
West: Lake Dr						
1	598	2	0.754	16.4	254	1600
	598	2	0.754	16.4	254	
=====						
ALL VEHICLES						
Total	%		Max	Aver.	Max	
Flow	HV		X	Delay	Queue	
1843	2		0.754	10.8	254	
=====						
Peak flow period = 15 minutes.						
Queue values in this table are 95% queue (feet)						
Note: Basic Saturation Flows at roundabouts or sign-controlled intersections apply only to continuous lanes.						

[Go to Table Links \(Top\)](#)

### Driver Characteristics

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

Lane No.	Satn Speed mph	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing ft	Average Queue Space ft	Driver Response Time sec
East: SE 62nd St						
1	21.6	1450	2.48	78.85	25.40	1.68
North: Lake Dr						
1	15.7	1479	2.43	55.86	25.40	1.33
West: Lake Dr						
1	24.5	1643	2.19	78.90	25.40	1.49

Saturation Flow and Saturation Headway are derived from follow-up headway.

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### Lane Delays

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### LANE DELAYS

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Stop-line Delay			Delay (seconds/veh)					
				1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	Stopd (Idle) di	Geom dig	Control dic
East: SE 62nd St												
1	0.330	NA	NA	0.0	0.0	0.0	0.3	0.0	0.0	0.0	3.9	3.9
North: Lake Dr												
1	0.585	NA	NA	1.0	0.0	1.0	2.1	0.0	0.0	0.0	9.6	10.6
West: Lake Dr												
1	0.754	NA	NA	6.1	6.5	12.6	6.2	6.4	3.8	2.6	3.9	16.4

SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay.

dSL: Stop-line delay (=d1+d2)

dn: Average stop-start delay for all vehicles queued and unqueued

dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay)

dqm: Queue move-up delay

di: Stopped delay (stopped (idling) time at near-zero speed)

dig: Geometric delay  
dic: Control delay

[Go to Table Links \(Top\)](#)

### Lane Queues

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### LANE QUEUES (VEHICLES)

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (veh)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
	x				Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: SE 62nd St														
1	0.330	NA	NA	0.0	1.0	0.0	1.0	2.5	0.02	0.04	0.0	NA	0.0	0.0
North: Lake Dr														
1	0.585	NA	NA	0.0	1.8	0.0	1.8	4.5	0.03	0.07	0.0	NA	0.2	0.4
West: Lake Dr														
1	0.754	NA	NA	1.1	2.6	1.5	4.0	10.0	0.06	0.16	0.0	NA	2.1	3.8

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUES (DISTANCE)

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (ft)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
	x				Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: SE 62nd St														
1	0.330	NA	NA	0.0	25.7	0.0	25.7	63.9	0.02	0.04	0.0	NA	0.1	0.2
North: Lake Dr														
1	0.585	NA	NA	0.0	45.6	0.0	45.6	113.4	0.03	0.07	0.0	NA	5.4	9.8
West: Lake Dr														
1	0.754	NA	NA	28.3	65.2	36.9	102.1	253.8	0.06	0.16	0.0	NA	53.0	96.2

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

[Go to Table Links \(Top\)](#)

### Lane Queue Percentiles

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### LANE QUEUE PERCENTILES (VEHICLES)

Lane No.	Deg. Satn x	Percentile Back of Queue (veh)						
		50%	70%	85%	90%	95%	98%	100%
East: SE 62nd St								
1	0.330	1.0	1.3	1.8	2.1	2.5	2.8	3.0
North: Lake Dr								
1	0.585	1.8	2.3	3.3	3.8	4.5	5.0	5.3
West: Lake Dr								
1	0.754	4.0	5.2	7.3	8.5	10.0	11.1	11.9



SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUE PERCENTILES (DISTANCE)

Lane No.	Deg. Satn x	Percentile Back of Queue (feet)						
		50%	70%	85%	90%	95%	98%	100%
East: SE 62nd St								
1	0.330	25.7	33.3	46.9	54.4	63.9	71.0	76.3
North: Lake Dr								
1	0.585	45.6	59.1	83.3	96.4	113.4	125.9	135.3
West: Lake Dr								
1	0.754	102.1	132.2	186.4	215.8	253.8	281.7	302.8

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

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### Lane Stops

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	-- Effective Stop Rate --				Total Stops H	Queue Move-up Rate	Total Queue Move-ups	Prop. Queued pq	Aver. Num. of Cycles to Depart
	x			he1	he2	Geom. Overall h	hgm		Hqm			
East: SE 62nd St												
1	0.330	NA	NA	0.01	0.00	0.41	0.42	200.1	0.00	0.0	0.07	0.07
North: Lake Dr												
1	0.585	NA	NA	0.26	0.00	0.38	0.64	490.5	0.00	0.0	0.43	0.43
West: Lake Dr												
1	0.754	NA	NA	0.98	0.22	0.00	1.20	718.5	0.56	332.0	0.99	1.54

hig is the average value for all movements in a shared lane  
hqm is average queue move-up rate for all vehicles queued and unqueued

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### Flow Rates

Origin-Destination Flow Rates (Total)

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### TOTAL FLOW RATES for All Movement Classes (veh/h)

From EAST To:			
Turn:	W	N	TOT
Flow Rate	134.8	340.2	475.0
%HV (all designations)	2.0	2.0	2.0
From NORTH To:			
Turn:	E	W	TOT
Flow Rate	756.5	14.1	770.7
%HV (all designations)	2.0	2.0	2.0
From WEST To:			
Turn:	N	E	TOT
Flow Rate	5.4	592.4	597.8

%HV (all designations)	2.0	2.0	2.0
------------------------	-----	-----	-----

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Origin-Destination Flow Rates by Movement Class

### Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

#### FLOW RATES for Light Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	132.1	333.4	465.5
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	741.4	13.8	755.2
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	5.3	580.5	585.9
Mov Class %	98.0	98.0	98.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0

#### FLOW RATES for Heavy Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	2.7	6.8	9.5
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	15.1	0.3	15.4
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	0.1	11.8	12.0
Mov Class %	2.0	2.0	2.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

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## Lane Flow Rates

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
 Roundabout

### LANE FLOW RATES AT STOP LINE (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Lane 1			
LV	132.1	333.4	465.5
HV	2.7	6.8	9.5
Total	134.8	340.2	475.0
Approach	134.8	340.2	475.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Lane 1			
LV	741.4	13.8	755.2
HV	15.1	0.3	15.4
Total	756.5	14.1	770.7
Approach	756.5	14.1	770.7
From WEST To:	N	E	
Turn:	L2	T1	TOT
Lane 1			
LV	5.3	580.5	585.9
HV	0.1	11.8	12.0
Total	5.4	592.4	597.8
Approach	5.4	592.4	597.8

### EXIT LANE FLOW RATES

Movement Class:	LV	HV	TOT
Exit: EAST			
Lane: 1	1321.9	27.0	1348.9
Total	1321.9	27.0	1348.9
Exit: NORTH			
Lane: 1	338.7	6.9	345.7
Total	338.7	6.9	345.7
Exit: WEST			
Lane: 1	145.9	3.0	148.9
Total	145.9	3.0	148.9

### DOWNSTREAM LANE FLOW RATES FOR EXIT ROADS

Movement Class:	LV	HV	TOT
Exit: EAST			
Lane: 1	1321.9	27.0	1348.9
Total	1321.9	27.0	1348.9

Exit: NORTH			
Lane: 1	338.7	6.9	345.7
Total	338.7	6.9	345.7
-----			
Exit: WEST			
Lane: 1	145.9	3.0	148.9
Total	145.9	3.0	148.9
-----			

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
Unit Time for Volumes = 60 minutes  
Peak Flow Period = 15 minutes  
Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Other

### Parameter Settings Summary

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

\* Basic Parameters:  
Intersection Type: Roundabout  
Driving on the right-hand side of the road  
Input data specified in US units  
Model Defaults: US HCM (Customary)  
Peak Flow Period (for performance): 15 minutes  
Unit time (for volumes): 60 minutes.  
SIDRA Standard Delay model used  
HCM Queue Model option used  
Level of Service based on: Delay and v/c (HCM 2010)  
Queue percentile: 95%

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### Diagnostics

Site: 9. 62nd & Lake - 2026 PM With Project

Site ID:  
Roundabout

Flow-Capacity Iterations:

Largest change in degree of saturation for any lane = 0.2 %  
Largest change in capacity for any lane = 2 veh/h

Other Diagnostic Messages (if any):





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Organisation: TRANSPORTATION SOLUTIONS INC | Processed: Thursday, March 15, 2018 8:52:35 AM

Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22

Comment Response\2026 62nd & Lake RAB.sip7

Intersection						
Int Delay, s/veh	15.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	172	62	75	378	395
Future Vol, veh/h	83	172	62	75	378	395
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	90	187	67	82	411	429
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	149	0	-	0	475	108
Stage 1	-	-	-	-	108	-
Stage 2	-	-	-	-	367	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1445	-	-	-	552	951
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	705	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1445	-	-	-	513	951
Mov Cap-2 Maneuver	-	-	-	-	513	-
Stage 1	-	-	-	-	921	-
Stage 2	-	-	-	-	656	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.5	0		23		
HCM LOS				C		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1445	-	-	-	513	951
HCM Lane V/C Ratio	0.062	-	-	-	0.801	0.451
HCM Control Delay (s)	7.7	0	-	-	34.6	11.9
HCM Lane LOS	A	A	-	-	D	B
HCM 95th %tile Q(veh)	0.2	-	-	-	7.6	2.4

Intersection: 1: 11th Ave NW/11th Ave & Lake Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	70	108	261	125	171	137	49	57
Average Queue (ft)	33	48	98	77	78	43	23	31
95th Queue (ft)	55	80	198	132	137	90	48	51
Link Distance (ft)		200	302		171	171	250	250
Upstream Blk Time (%)			0		1	0		
Queuing Penalty (veh)			2		1	0		
Storage Bay Dist (ft)	100			75				
Storage Blk Time (%)	0	0	19	4				
Queuing Penalty (veh)	0	0	63	14				

Intersection: 2: West Driveway/Warehouse & Lake Drive

Movement	EB	WB	WB	NB	SB
Directions Served	L	L	TR	LTR	LTR
Maximum Queue (ft)	44	33	42	80	103
Average Queue (ft)	13	7	2	36	45
95th Queue (ft)	38	27	27	63	83
Link Distance (ft)			189	96	102
Upstream Blk Time (%)			0	0	1
Queuing Penalty (veh)			0	0	0
Storage Bay Dist (ft)	160	70			
Storage Blk Time (%)			0		
Queuing Penalty (veh)			0		

Intersection: 3: Building 2 Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	R	L	R
Maximum Queue (ft)	42	27	34	66	84	82	96
Average Queue (ft)	14	2	5	6	41	35	45
95th Queue (ft)	36	11	23	31	68	67	78
Link Distance (ft)		189		326	83	108	108
Upstream Blk Time (%)					0	0	0
Queuing Penalty (veh)					0	0	0
Storage Bay Dist (ft)	70		50				
Storage Blk Time (%)		0	0	0			
Queuing Penalty (veh)		0	0	0			

Intersection: 4: Lake Drive & 10th Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	86	98	134	100	41	69
Average Queue (ft)	47	33	64	70	14	33
95th Queue (ft)	73	67	106	105	37	56
Link Distance (ft)		326	211		217	217
Upstream Blk Time (%)		0				
Queuing Penalty (veh)		1				
Storage Bay Dist (ft)	50			50		
Storage Blk Time (%)	4	1	13	8		
Queuing Penalty (veh)	5	2	53	32		

Intersection: 5: Lake Drive & Building 1 Driveway/Garage Driveway

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	83	102	29	19	28
Average Queue (ft)	35	70	3	1	2
95th Queue (ft)	67	112	16	9	36
Link Distance (ft)	76	87			211
Upstream Blk Time (%)	2	11			1
Queuing Penalty (veh)	0	0			1
Storage Bay Dist (ft)			50	75	
Storage Blk Time (%)					1
Queuing Penalty (veh)					0

Intersection: 6: Lake Drive & Building 3 Driveway

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	63	27	38
Average Queue (ft)	24	3	8
95th Queue (ft)	52	17	94
Link Distance (ft)	99		378
Upstream Blk Time (%)	0		1
Queuing Penalty (veh)	0		2
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 7: Lake Drive & Garage/Trading Building Driveway

Movement	WB	WB	NB	SB	SB
Directions Served	L	R	TR	L	T
Maximum Queue (ft)	95	107	7	18	12
Average Queue (ft)	47	47	0	1	3
95th Queue (ft)	83	85	4	9	35
Link Distance (ft)	124	124	163		117
Upstream Blk Time (%)	3	0			3
Queuing Penalty (veh)	0	0			4
Storage Bay Dist (ft)				50	
Storage Blk Time (%)				0	3
Queuing Penalty (veh)				0	0

Intersection: 8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Movement	EB	EB	WB	NB	SB	SB
Directions Served	L	TR	LTR	L	L	TR
Maximum Queue (ft)	110	111	74	55	22	27
Average Queue (ft)	56	89	32	22	1	6
95th Queue (ft)	101	128	61	51	11	53
Link Distance (ft)	96	96	85			163
Upstream Blk Time (%)	3	18	2			3
Queuing Penalty (veh)	0	0	0			8
Storage Bay Dist (ft)				50	50	
Storage Blk Time (%)				0		3
Queuing Penalty (veh)				1		0

Intersection: 10: 62nd St & Lot 5 Driveway

Movement	EB	WB	SB	SB
Directions Served	LT	TR	L	R
Maximum Queue (ft)	89	30	117	117
Average Queue (ft)	27	7	100	86
95th Queue (ft)	94	58	140	128
Link Distance (ft)	199	145	102	102
Upstream Blk Time (%)	3	3	32	10
Queuing Penalty (veh)	0	4	0	0
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Zone Summary

Zone wide Queuing Penalty: 195



**Mitigation Output**

Intersection

Intersection Delay, s/veh	24.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱		↰↱			↰↱	
Traffic Vol, veh/h	2	383	14	4	75	83	6	10	2	351	51	13
Future Vol, veh/h	2	383	14	4	75	83	6	10	2	351	51	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	2	416	15	4	82	90	7	11	2	382	55	14
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	27.4	10.7	10.5	28.4
HCM LOS	D	B	B	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	55%	0%	100%	0%	5%	0%	93%	0%
Vol Thru, %	45%	71%	0%	96%	95%	0%	7%	66%
Vol Right, %	0%	29%	0%	4%	0%	100%	0%	34%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	11	7	2	397	79	83	377	39
LT Vol	6	0	2	0	4	0	351	0
Through Vol	5	5	0	383	75	0	26	26
RT Vol	0	2	0	14	0	83	0	13
Lane Flow Rate	12	8	2	432	86	90	409	42
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.026	0.016	0.004	0.768	0.168	0.158	0.782	0.073
Departure Headway (Hd)	7.814	7.38	6.919	6.404	7.046	6.321	6.88	6.254
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	460	487	514	561	512	571	524	570
Service Time	5.521	5.087	4.703	4.188	4.748	4.023	4.655	4.028
HCM Lane V/C Ratio	0.026	0.016	0.004	0.77	0.168	0.158	0.781	0.074
HCM Control Delay	10.7	10.2	9.7	27.5	11.2	10.2	30.3	9.5
HCM Lane LOS	B	B	A	D	B	B	D	A
HCM 95th-tile Q	0.1	0	0	6.9	0.6	0.6	7.1	0.2







HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5-Mitigation

Timing Plan: AM

Intersection

Int Delay, s/veh 0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	691	43	18	151	1	14	2	11	1	0	1
Future Vol, veh/h	2	691	43	18	151	1	14	2	11	1	0	1
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	2	743	46	19	162	1	15	2	12	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	166	0	0	800	0	0	983	986	777	982	1010	166
Stage 1	-	-	-	-	-	-	781	781	-	205	205	-
Stage 2	-	-	-	-	-	-	202	205	-	777	805	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1424	-	-	832	-	-	230	247	400	230	242	884
Stage 1	-	-	-	-	-	-	391	404	-	802	736	-
Stage 2	-	-	-	-	-	-	805	730	-	393	398	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1424	-	-	832	-	-	223	238	396	217	233	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	223	238	-	217	233	-
Stage 1	-	-	-	-	-	-	387	400	-	799	717	-
Stage 2	-	-	-	-	-	-	786	712	-	379	394	-








Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	19.8	15.4
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	273	1424	-	-	832	-	-	348
HCM Lane V/C Ratio	0.106	0.002	-	-	0.023	-	-	0.006
HCM Control Delay (s)	19.8	7.5	-	-	9.4	-	-	15.4
HCM Lane LOS	C	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0.1	-	-	0

HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5-Mitigation

Timing Plan: AM

Intersection												
Int Delay, s/veh	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	624	77	47	162	2	0	0	16	11	0	7
Future Vol, veh/h	3	624	77	47	162	2	0	0	16	11	0	7
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	3	657	81	49	171	2	0	0	17	12	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	175	0	0	739	0	0	-	-	698	977	-	200
Stage 1	-	-	-	-	-	-	-	-	-	273	-	-
Stage 2	-	-	-	-	-	-	-	-	-	704	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	1414	-	-	876	-	-	0	0	444	232	0	846
Stage 1	-	-	-	-	-	-	0	0	-	737	0	-
Stage 2	-	-	-	-	-	-	0	0	-	431	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1383	-	-	876	-	-	-	-	444	213	-	826
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	213	-	-
Stage 1	-	-	-	-	-	-	-	-	-	734	-	-
Stage 2	-	-	-	-	-	-	-	-	-	414	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	2.1	13.4	17.7
HCM LOS			B	C













Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	444	1383	-	-	876	-	-	213	826
HCM Lane V/C Ratio	0.038	0.002	-	-	0.056	-	-	0.054	0.009
HCM Control Delay (s)	13.4	7.6	-	-	9.4	-	-	22.9	9.4
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.2	-	-	0.2	0

# HCM 2010 Signalized Intersection Summary

## 4: Lake Drive & 10th Ave

Costco Buildings 4 and 5-Mitigation

Timing Plan: AM

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	59	609	15	50	436	76		
Future Volume (veh/h)	59	609	15	50	436	76		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	64	662	16	54	474	83		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	691	875	556	472	600	536		
Arrive On Green	0.06	0.46	0.29	0.29	0.33	0.33		
Sat Flow, veh/h	1810	1900	1900	1615	1810	1615		
Grp Volume(v), veh/h	64	662	16	54	474	83		
Grp Sat Flow(s),veh/h/ln	1810	1900	1900	1615	1810	1615		
Q Serve(g_s), s	0.8	11.1	0.2	0.9	9.1	1.4		
Cycle Q Clear(g_c), s	0.8	11.1	0.2	0.9	9.1	1.4		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	691	875	556	472	600	536		
V/C Ratio(X)	0.09	0.76	0.03	0.11	0.79	0.15		
Avail Cap(c_a), veh/h	809	1529	1085	922	1221	1090		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	7.0	8.6	9.7	10.0	11.7	9.1		
Incr Delay (d2), s/veh	0.1	1.4	0.0	0.1	2.4	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	0.7	10.1	0.2	0.8	8.5	2.7		
LnGrp Delay(d),s/veh	7.1	10.0	9.7	10.1	14.0	9.2		
LnGrp LOS	A	A	A	B	B	A		
Approach Vol, veh/h		726	70		557			
Approach Delay, s/veh		9.7	10.0		13.3			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				21.7		16.8	6.5	15.3
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				31.0		26.0	5.0	22.0
Max Q Clear Time (g_c+I1), s				13.1		11.1	2.8	2.9
Green Ext Time (p_c), s				4.6		1.6	0.0	4.8
Intersection Summary								
HCM 2010 Ctrl Delay			11.2					
HCM 2010 LOS			B					







HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5-Mitigation

Timing Plan: AM

Intersection

Int Delay, s/veh 2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	5	2	1	0	1	17	54	205	287	790	9
Future Vol, veh/h	5	5	2	1	0	1	17	54	205	287	790	9
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	5	2	1	0	1	18	59	223	312	859	10

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1696	1806	864	1698	1699	170	868	0	0	282	0	0
Stage 1	1488	1488	-	207	207	-	-	-	-	-	-	-
Stage 2	208	318	-	1491	1492	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	74	80	357	74	93	879	785	-	-	1292	-	-
Stage 1	156	189	-	800	734	-	-	-	-	-	-	-
Stage 2	799	657	-	156	189	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	59	59	357	55	69	879	785	-	-	1292	-	-
Mov Cap-2 Maneuver	59	59	-	55	69	-	-	-	-	-	-	-
Stage 1	152	143	-	782	717	-	-	-	-	-	-	-
Stage 2	780	642	-	113	143	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	69	40.4	0.6	2.3
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	785	-	-	69	104	1292	-
HCM Lane V/C Ratio	0.024	-	-	0.189	0.021	0.241	-
HCM Control Delay (s)	9.7	-	-	69	40.4	8.7	-
HCM Lane LOS	A	-	-	F	E	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	0.9	-

Queuing and Blocking Report  
2026 With-Development (Lake/10th Signal)

Costco Buildings 4 and 5-Mitigation  
Timing Plan: AM

Intersection: 1: 11th Ave NW/11th Ave & Lake Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	18	209	64	53	36	31	240	142
Average Queue (ft)	1	93	33	30	11	4	95	21
95th Queue (ft)	8	172	54	46	35	21	179	76
Link Distance (ft)		200	302		171	171	250	250
Upstream Blk Time (%)		2					1	0
Queuing Penalty (veh)		0					0	0
Storage Bay Dist (ft)	100			75				
Storage Blk Time (%)		11	0					
Queuing Penalty (veh)		0	0					

Intersection: 2: West Driveway/Warehouse & Lake Drive

Movement	EB	WB	NB	SB
Directions Served	L	L	LTR	LTR
Maximum Queue (ft)	2	41	42	24
Average Queue (ft)	0	10	18	2
95th Queue (ft)	3	35	44	12
Link Distance (ft)			96	102
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	160	70		
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 3: Building 2 Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	R	L	R
Maximum Queue (ft)	5	57	51	36	34	42	27
Average Queue (ft)	0	7	20	3	12	12	6
95th Queue (ft)	5	31	46	18	36	36	25
Link Distance (ft)		189		326	83	108	108
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	70		50				
Storage Blk Time (%)		0	1	0			
Queuing Penalty (veh)		0	1	0			

Queuing and Blocking Report  
2026 With-Development (Lake/10th Signal)

Costco Buildings 4 and 5-Mitigation  
Timing Plan: AM

Intersection: 4: Lake Drive & 10th Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	99	232	42	50	224	105
Average Queue (ft)	28	134	7	19	128	24
95th Queue (ft)	78	211	30	45	207	64
Link Distance (ft)		326	211		217	217
Upstream Blk Time (%)					1	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)	50			50		
Storage Blk Time (%)	1	26	0	0		
Queuing Penalty (veh)	5	15	0	0		

Intersection: 5: Lake Drive & Building 1 Driveway/Garage Driveway

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	33	18	33	33	87	41
Average Queue (ft)	10	1	8	4	40	1
95th Queue (ft)	33	10	29	19	72	27
Link Distance (ft)	76	87		378		211
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (ft)			50		75	
Storage Blk Time (%)			0	0	1	0
Queuing Penalty (veh)			0	0	4	0

Zone Summary

Zone wide Queuing Penalty: 26










HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5-Mitigato  
Timing Plan: PM

Intersection

Int Delay, s/veh 5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	166	10	33	552	53	0	0	115	70	0	131
Future Vol, veh/h	36	166	10	33	552	53	0	0	115	70	0	131
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	38	175	11	35	581	56	0	0	121	74	0	138

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	639	0	0	186	0	0	-	-	181	936	-	637
Stage 1	-	-	-	-	-	-	-	-	-	680	-	-
Stage 2	-	-	-	-	-	-	-	-	-	256	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	955	-	-	1401	-	-	0	0	867	247	0	481
Stage 1	-	-	-	-	-	-	0	0	-	444	0	-
Stage 2	-	-	-	-	-	-	0	0	-	753	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	934	-	-	1401	-	-	-	-	866	202	-	470
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	202	-	-
Stage 1	-	-	-	-	-	-	-	-	-	425	-	-
Stage 2	-	-	-	-	-	-	-	-	-	621	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.4	9.8	21.7
HCM LOS			A	C













Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	866	934	-	-	1401	-	-	202	470
HCM Lane V/C Ratio	0.14	0.041	-	-	0.025	-	-	0.365	0.293
HCM Control Delay (s)	9.8	9	-	-	7.6	-	-	32.7	15.8
HCM Lane LOS	A	A	-	-	A	-	-	D	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	1.6	1.2

# HCM 2010 Signalized Intersection Summary

## 4: Lake Drive & 10th Ave

Costco Buildings 4 and 5-Mitigato

Timing Plan: PM

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	260	103	384	414	21	131		
Future Volume (veh/h)	260	103	384	414	21	131		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	283	112	417	450	23	142		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	585	1214	753	640	265	236		
Arrive On Green	0.13	0.64	0.40	0.40	0.15	0.15		
Sat Flow, veh/h	1810	1900	1900	1615	1810	1615		
Grp Volume(v), veh/h	283	112	417	450	23	142		
Grp Sat Flow(s),veh/h/ln	1810	1900	1900	1615	1810	1615		
Q Serve(g_s), s	2.9	0.8	6.3	8.7	0.4	3.1		
Cycle Q Clear(g_c), s	2.9	0.8	6.3	8.7	0.4	3.1		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	585	1214	753	640	265	236		
V/C Ratio(X)	0.48	0.09	0.55	0.70	0.09	0.60		
Avail Cap(c_a), veh/h	875	1938	1173	997	923	824		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	5.4	2.6	8.7	9.4	13.7	14.9		
Incr Delay (d2), s/veh	0.6	0.0	0.6	1.4	0.1	2.4		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	2.6	0.8	6.1	7.2	0.4	5.2		
LnGrp Delay(d),s/veh	6.1	2.6	9.3	10.8	13.9	17.3		
LnGrp LOS	A	A	A	B	B	B		
Approach Vol, veh/h		395	867		165			
Approach Delay, s/veh		5.1	10.1		16.8			
Approach LOS		A	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				27.8		9.5	9.0	18.8
Change Period (Y+Rc), s				4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s				38.0		19.0	11.0	23.0
Max Q Clear Time (g_c+I1), s				2.8		5.1	4.9	10.7
Green Ext Time (p_c), s				5.6		0.4	0.4	4.1
Intersection Summary								
HCM 2010 Ctrl Delay			9.5					
HCM 2010 LOS			A					

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5-Mitigatoir

Timing Plan: PM

Intersection												
Int Delay, s/veh	7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	58	1	12	51	9	134	19	589	1	3	101	16
Future Vol, veh/h	58	1	12	51	9	134	19	589	1	3	101	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	63	1	13	55	10	146	21	640	1	3	110	17

Major/Minor	Minor2		Minor1		Major1		Major2		Major2		Major2	
Conflicting Flow All	885	808	118	814	816	641	127	0	0	641	0	0
Stage 1	125	125	-	682	682	-	-	-	-	-	-	-
Stage 2	760	683	-	132	134	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	268	317	939	299	314	478	1472	-	-	953	-	-
Stage 1	884	796	-	443	453	-	-	-	-	-	-	-
Stage 2	401	452	-	876	789	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	179	311	939	290	309	478	1472	-	-	953	-	-
Mov Cap-2 Maneuver	179	311	-	290	309	-	-	-	-	-	-	-
Stage 1	871	793	-	437	447	-	-	-	-	-	-	-
Stage 2	269	446	-	860	787	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	32	23.6	0.2	0.2
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1472	-	-	209	400	953	-
HCM Lane V/C Ratio	0.014	-	-	0.369	0.527	0.003	-
HCM Control Delay (s)	7.5	-	-	32	23.6	8.8	-
HCM Lane LOS	A	-	-	D	C	A	-
HCM 95th %tile Q(veh)	0	-	-	1.6	3	0	-

Queuing and Blocking Report  
2026 With-Development (Lake/10th Signal)

Costco Buildings 4 and 5-Mitigatoin  
Timing Plan: PM

Intersection: 3: Building 2 Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	R	L	R
Maximum Queue (ft)	42	49	28	55	74	74	97
Average Queue (ft)	12	3	3	5	39	35	46
95th Queue (ft)	33	20	16	29	62	65	79
Link Distance (ft)		93		326	83	108	108
Upstream Blk Time (%)		0			0	0	0
Queuing Penalty (veh)		0			0	0	0
Storage Bay Dist (ft)	70		50				
Storage Blk Time (%)	0	0		0			
Queuing Penalty (veh)	0	0		0			

Intersection: 4: Lake Drive & 10th Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	92	76	222	100	42	79
Average Queue (ft)	57	18	100	78	12	37
95th Queue (ft)	86	54	189	117	36	63
Link Distance (ft)		326	211		217	217
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			3			
Storage Bay Dist (ft)	50			50		
Storage Blk Time (%)	10	0	16	7		
Queuing Penalty (veh)	10	1	68	25		

Intersection: 5: Lake Drive & Building 1 Driveway/Garage Driveway

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	81	102	26	49	21	2
Average Queue (ft)	37	68	2	2	2	0
95th Queue (ft)	68	110	14	24	13	2
Link Distance (ft)	76	87		412		211
Upstream Blk Time (%)	1	9				
Queuing Penalty (veh)	0	0				
Storage Bay Dist (ft)			50		75	
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Network Summary

Network wide Queuing Penalty: 108

# MOVEMENT SUMMARY

 **Site: [4. 10th & Lake - 2026 AM With Project - Single Lane RAB]**

Costco Buildings 4 and 5  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Lake Dr											
6	T1	16	0.0	0.051	4.0	LOS A	0.3	6.6	0.20	0.43	37.6
16	R2	54	0.0	0.051	4.1	LOS A	0.3	6.6	0.20	0.43	36.4
Approach		71	0.0	0.051	4.0	LOS A	0.3	6.6	0.20	0.43	36.7
North: 10th Ave NW											
7	L2	474	0.0	0.381	9.8	LOS A	2.4	59.1	0.11	0.61	35.2
14	R2	83	0.0	0.381	3.9	LOS A	2.4	59.1	0.11	0.61	34.1
Approach		557	0.0	0.381	8.9	LOS A	2.4	59.1	0.11	0.61	35.0
West: Lake Dr											
5	L2	64	0.0	0.663	14.7	LOS B	6.7	166.7	0.76	0.84	35.2
2	T1	662	0.0	0.663	8.8	LOS A	6.7	166.7	0.76	0.84	35.0
Approach		726	0.0	0.663	9.3	LOS A	6.7	166.7	0.76	0.84	35.1
All Vehicles		1353	0.0	0.663	8.9	LOS A	6.7	166.7	0.46	0.72	35.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22 Comment Response \2026 10th & Lake RAB.sip7

DETAILED OUTPUT

 Site: [4. 10th & Lake - 2026 AM With Project - Single Lane RAB]

Costco Buildings 4 and 5  
Roundabout

OUTPUT TABLE LINKS

-  Roundabouts
  - Roundabout Basic Parameters
  - Roundabout Circulating / Exiting Stream Parameters
  - Roundabout Gap Acceptance Parameters
  - Roundabout Flow Rates
-  Movements
  - Intersection Negotiation and Travel Data
  - Movement Capacity and Performance Parameters
  - Fuel Consumption, Emissions and Cost
-  Lanes
  - Lane Performance and Capacity Information
  - Lane, Approach and Intersection Performance
  - Driver Characteristics
  - Lane Delays
  - Lane Queues
  - Lane Queue Percentiles
  - Lane Stops
-  Flow Rates
  - Origin-Destination Flow Rates (Total)
  - Origin-Destination Flow Rates by Movement Class
  - Lane Flow Rates
-  Other
  - Parameter Settings Summary
  - Diagnostics

Roundabouts

Roundabout Basic Parameters  
Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID: Roundabout												
Central Island Diam ft	Circ Width ft	Insc Diam. ft	Entry Radius ft	Entry Angle deg	Circ Lanes	Entry Lanes	Av.Entry Lane Width ft	Appr Dist ft	Prop Upstr	Queued Signal	Extra Bunching %	
East: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
North: 10th Ave NW												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
West: Lake Dr												
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N	
Roundabout Capacity Model: SIDRA Standard												
NA Not Applicable (single Site analysis or unconnected Site in Network analysis).												
N Program option resulted in zero value (single Site analysis or unconnected Site in Network analysis).												

[Go to Table Links \(Top\)](#)

Roundabout Circulating / Exiting Stream Parameters  
Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	Opng Flow veh/h	HVE pcu/h	Adj. Flow pcu/h	%Near Lane Only	%Exit Flow Incl.	Cap. Const. Effect	O-D Factor	Aver Speed mph	In-Bunch Headway sec	Prop. Bunched
East: Lake Dr													
W	T1	1	Dominant	64	1.00	64	0.0	0.0	N	0.984	15.6	2.00	0.075
N	R2	1	Dominant	64	1.00	64	0.0	0.0	N	0.984	15.6	2.00	0.075
North: 10th Ave NW													
E	L2	1	Dominant	16	1.00	16	0.0	0.0	N	0.999	24.6	2.00	0.020
W	R2	1	Dominant	16	1.00	16	0.0	0.0	N	0.999	24.6	2.00	0.020
West: Lake Dr													
N	L2	1	Dominant	474	1.00	474	0.0	0.0	N	0.987	15.6	2.00	0.440
E	T1	1	Dominant	474	1.00	474	0.0	0.0	N	0.987	15.6	2.00	0.440

Roundabout Capacity Model: SIDRA Standard

[Go to Table Links \(Top\)](#)

### Roundabout Gap Acceptance Parameters

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	In-Bunch Headway sec	Prop. Bunched	Priority Sharing	HVE for Entry	Critical Gap		Follow-up Headway sec
								Headway sec	Dist ft	
East: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
W	T1	1	Dominant	2.00	0.075	Y	1.00	4.20	95.9	2.41
N	R2	1	Dominant	2.00	0.075	Y	1.00	4.20	95.9	2.41
North: 10th Ave NW										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
E	L2	1	Dominant	2.00	0.020	Y	1.00	4.28	154.5	2.43
W	R2	1	Dominant	2.00	0.020	Y	1.00	4.28	154.5	2.43
West: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
N	L2	1	Dominant	2.00	0.440	Y	1.00	3.63	82.9	2.26
E	T1	1	Dominant	2.00	0.440	Y	1.00	3.63	82.9	2.26

Roundabout Capacity Model: SIDRA Standard

Priority sharing means Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

[Go to Table Links \(Top\)](#)

### Roundabout Flow Rates

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

#### CIRCULATING LANE FLOW RATES

Lane No.	Circulating Flow Rate		
	veh/h	pcu/h	Percent

East: Lake Dr

1	64	64	100.0%
Total	64	64	

North: 10th Ave NW			
1	16	16	100.0%
Total	16	16	

West: Lake Dr			
1	474	474	100.0%
Total	474	474	

The SIDRA Standard roundabout capacity model option is in use.  
This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

#### APPROACH LANE FLOW RATES

Lane No.	Approach Flows (veh/h)		
	Out	To Downst	Total

East: Lake Dr			
1	54	17	71
Total	54	17	71

North: 10th Ave NW			
1	83	474	557
Total	83	474	557

West: Lake Dr			
1	662	64	726
Total	662	64	726

[Go to Table Links \(Top\)](#)

## Movements

### Intersection Negotiation and Travel Data

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

#### TRAVEL SPEED, TRAVEL DISTANCE AND TRAVEL TIME

From Approach	To Exit	Turn	Running Speed mph	Travel Speed mph	Travel Distance ft	Travel Time s	Total Dem Flows veh-mi/h	Travel Distance Arv Flows veh-mi/h	Tot.Trav. Time veh-h/h
East: Lake Dr									
	West	T1	37.6	37.6	3272.6#	59.3#	10.1	10.1	0.3
	North	R2	36.4	36.4	3272.6#	61.3#	33.7	33.7	0.9
North: 10th Ave NW									
	East	L2	35.2	35.2	3402.0#	65.9#	305.3	305.3	8.7
	West	R2	34.1	34.1	3402.0#	68.0#	53.2	53.2	1.6
West: Lake Dr									
	North	L2	35.3	35.2	3342.7#	64.8#	40.6	40.6	1.2
	East	T1	35.2	35.0	3342.7#	65.0#	419.1	419.1	12.0
ALL VEHICLES:			35.2	35.1	3363.4#	65.3#	862.0	862.0	24.5

"Running Speed" is the average speed excluding stopped periods.

Travel Time values include cruise times and intersection delays including acceleration, deceleration and idling delays.

# Travel Distance and Travel Time values include travel on the External Exit section based on the Exit Distance or user-specified Downstream Distance value as applicable.

#### INTERSECTION NEGOTIATION DATA



From Approach	To Exit	Turn	Negn Radius ft	Negn Speed mph	Negn Dist. ft	Appr. Dist. ft	Exit Dist. ft	Downstr. Dist. ft
-----								
East: Lake Dr								
	West	T1	194.9	24.6	134.4	1600	488	NA
	North	R2	119.4	20.5	54.0	1600	488	NA
-----								
North: 10th Ave NW								
	East	L2	58.0	15.6	227.8	1600	488	NA
	West	R2	119.4	20.5	54.0	1600	488	NA
-----								
West: Lake Dr								
	North	L2	58.0	15.6	227.8	1600	488	NA
	East	T1	194.9	24.6	134.4	1600	488	NA
-----								
Maximum Negotiation (Design) Speed = 30.0 mph								
NA Downstream Distance does not apply if:								
- Exit is an internal leg of a network								
- "Program" option was specified								
- Distance specified was less than the Exit Negotiation Distance								
- Distance specified was greater than the exit leg length								
MOVEMENT SPEEDS AND GEOMETRIC DELAY								
-----								
Mov ID	Turn	App. Speeds		Exit Speeds		Queue Move-up Speed mph	Geom Delay sec	
		Cruise mph	Negn mph	Negn mph	Cruise mph			
-----								
East: Lake Dr								
6	T1	40.0	24.6	24.6	40.0	34.5	3.8	
16	R2	40.0	20.5	20.5	40.0	34.5	3.8	
-----								
North: 10th Ave NW								
7	L2	40.0	15.6	15.6	40.0	26.2	9.7	
14	R2	40.0	20.5	20.5	40.0	26.2	3.8	
-----								
West: Lake Dr								
5	L2	40.0	15.6	15.6	40.0	23.8	9.7	
2	T1	40.0	24.6	24.6	40.0	23.8	3.8	
-----								

[Go to Table Links \(Top\)](#)

## Movement Capacity and Performance Parameters

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

### MOVEMENT CAPACITY PARAMETERS

Mov ID	Turn	Mov Cl.	Arv Flow veh/h	Opng Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Deg. Satn x
East: Lake Dr									
6	T1	#	16	64	64	321	0.85	1575	0.051
16	R2	#	54	64	64	1071	0.85	1575	0.051
North: 10th Ave NW									
7	L2	#	474	16	16	1242	0.85	123	0.381
14	R2	#	83	16	16	217	0.85	123	0.381
West: Lake Dr									
5	L2	#	64	474	474	97	0.85	28	0.663*
2	T1	#	662	474	474	998	0.85	28	0.663*

\* Maximum degree of saturation

# Combined Movement Capacity parameters are shown for all Movement Classes.

## MOVEMENT PERFORMANCE

Mov ID	Turn	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-mi/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (mph)
East: Lake Dr										
6	T1	0.02	0.02	4.0	0.43	7.0	0.41	10.1	0.3	37.6
16	R2	0.06	0.07	4.1	0.43	23.2	1.14	33.7	0.9	36.4
North: 10th Ave NW										
7	L2	1.29	1.55	9.8	0.61	289.1	11.48	305.3	8.7	35.2
14	R2	0.09	0.11	3.9	0.61	50.4	2.65	53.2	1.6	34.1
West: Lake Dr										
5	L2	0.26	0.31	14.7	0.84	53.9	4.26	40.6	1.2	35.2
2	T1	1.61	1.93	8.8	0.84	556.2	17.86	419.1	12.0	35.0

[Go to Table Links \(Top\)](#)

## Fuel Consumption, Emissions and Cost

Site: 4. 10th &amp; Lake - 2026 AM With Project - Single Lane RAB

 Site ID:  
 Roundabout

## FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov ID	Turn	Cost Total \$/h	Fuel Total gal/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
East: Lake Dr							
6	T1	3.55	0.3	3.0	0.00	0.000	0.001
16	R2	11.85	1.1	10.1	0.01	0.001	0.003
		15.40	1.5	13.1	0.02	0.001	0.004
North: 10th Ave NW							
7	L2	122.31	10.8	96.5	0.13	0.009	0.031
14	R2	21.32	1.9	16.8	0.02	0.002	0.005
		143.63	12.7	113.3	0.15	0.010	0.037
West: Lake Dr							
5	L2	15.63	1.4	12.8	0.02	0.001	0.004
2	T1	161.35	14.8	131.7	0.18	0.012	0.044
		176.98	16.2	144.4	0.19	0.013	0.048
INTERSECTION:		336.01	30.4	270.8	0.36	0.025	0.089

## FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov ID	Turn	Cost Rate \$/mi	Fuel Eff. mpg	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
East: Lake Dr							
6	T1	0.22	29.7	186.3	0.26	0.017	0.060
16	R2	0.22	29.7	186.3	0.26	0.017	0.060
		0.22	29.7	186.3	0.26	0.017	0.060
North: 10th Ave NW							
7	L2	0.25	28.2	196.3	0.26	0.018	0.064
14	R2	0.25	28.2	196.3	0.26	0.018	0.064
		0.25	28.2	196.3	0.26	0.018	0.064
West: Lake Dr							
5	L2	0.24	28.3	195.2	0.26	0.018	0.065

2	T1	0.24	28.3	195.2	0.26	0.018	0.065
		0.24	28.3	195.2	0.26	0.018	0.065
INTERSECTION:		0.24	28.3	195.2	0.26	0.018	0.064

[Go to Table Links \(Top\)](#)

Lanes

Lane Performance and Capacity Information  
Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

LANE PERFORMANCE

						Q u e u e		
Lane	Flow	Cap	Deg.	Aver.	Eff.	95% Back		Lane
No.	veh/h	veh/h	Satn	Delay	Stop	-----		Length
			x	sec	Rate	veh	ft	ft
East: Lake Dr								
1	71	1392	0.051	4.0	0.43	0.3	6.6	1600.0
North: 10th Ave NW								
1	557	1459	0.381	8.9	0.61	2.4	59.1	1600.0
West: Lake Dr								
1	726	1095	0.663	9.3	0.84	6.7	166.7	1600.0

LANE FLOW AND CAPACITY INFORMATION

Lane No.	Total Arv Flow (veh/h)	Min Cap veh/h	Tot Cap veh/h	Deg. Satn x	Lane Util %
East: Lake Dr					
1	71	71	1392	0.051	100
North: 10th Ave NW					
1	557	150	1459	0.381	100
West: Lake Dr					
1	726	150	1095	0.663	100

The capacity values of Continuous Lanes are obtained by adjusting the basic saturation flow for lane width, grade, movement class and turning vehicle effects. Saturation flow scale applies if specified.

[Go to Table Links \(Top\)](#)

Lane, Approach and Intersection Performance  
Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

Lane No.	Arrival Flow (veh/h)	%HV	Adj. Basic Satf.	Deg Sat x	Aver. Delay sec	Longest Queue ft	Lane Length ft
East: Lake Dr							
1	71	0		0.051	4.0	7	1600
	71	0		0.051	4.0	7	
North: 10th Ave NW							

1	557	0	0.381	8.9	59	1600
	557	0	0.381	8.9	59	
West: Lake Dr						
1	726	0	0.663	9.3	167	1600
	726	0	0.663	9.3	167	
=====						
ALL VEHICLES						
	Total	%	Max	Aver.	Max	
	Flow	HV	X	Delay	Queue	
	1353	0	0.663	8.9	167	
=====						
Peak flow period = 15 minutes.						
Queue values in this table are 95% queue (feet)						
Note: Basic Saturation Flows at roundabouts or sign-controlled intersections apply only to continuous lanes.						

[Go to Table Links \(Top\)](#)

### Driver Characteristics

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

Lane No.	Satn Speed mph	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing ft	Average Queue Space ft	Driver Response Time sec
East: Lake Dr						
1	21.4	1492	2.41	75.83	25.00	1.62
North: 10th Ave NW						
1	16.3	1481	2.43	58.08	25.00	1.38
West: Lake Dr						
1	23.8	1593	2.26	78.98	25.00	1.54

Saturation Flow and Saturation Headway are derived from follow-up headway.

[Go to Table Links \(Top\)](#)

### Lane Delays

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

#### LANE DELAYS

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Stop-line Delay			Delay (seconds/veh)					
				1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing dq	Stopd MvUp dqm	(Idle) di	Geom dig	Control dic
East: Lake Dr												
1	0.051	NA	NA	0.2	0.0	0.2	1.0	0.0	0.0	0.0	3.8	4.0
North: 10th Ave NW												
1	0.381	NA	NA	0.1	0.0	0.1	0.5	0.0	0.0	0.0	8.9	8.9
West: Lake Dr												
1	0.663	NA	NA	3.4	1.6	5.0	4.5	0.5	0.2	0.3	4.3	9.3

SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay.

dSL: Stop-line delay (=d1+d2)

dn: Average stop-start delay for all vehicles queued and unqueued

dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay)

dqm: Queue move-up delay

di: Stopped delay (stopped (idling) time at near-zero speed)  
 dig: Geometric delay  
 dic: Control delay

[Go to Table Links \(Top\)](#)

### Lane Queues

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

#### LANE QUEUES (VEHICLES)

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (veh)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
	x				Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: Lake Dr														
1	0.051	NA	NA	0.0	0.1	0.0	0.1	0.3	0.00	0.00	0.0	NA	0.0	0.0
North: 10th Ave NW														
1	0.381	NA	NA	0.0	1.0	0.0	1.0	2.4	0.01	0.04	0.0	NA	0.0	0.0
West: Lake Dr														
1	0.663	NA	NA	0.4	2.1	0.6	2.7	6.7	0.04	0.10	0.0	NA	1.0	1.8

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUES (DISTANCE)

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (ft)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue			
	x						Nb1	Nb2	Nb	95%			Av.	95%	Nc	95%
East: Lake Dr																
1	0.051	NA	NA	0.0	2.6	0.0	2.6	6.6	0.00	0.00	0.0	NA	0.1	0.2		
North: 10th Ave NW																
1	0.381	NA	NA	0.0	23.8	0.0	23.8	59.1	0.01	0.04	0.0	NA	0.3	0.6		
West: Lake Dr																
1	0.663	NA	NA	9.8	51.7	15.4	67.1	166.7	0.04	0.10	0.0	NA	25.1	45.5		

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

[Go to Table Links \(Top\)](#)

### Lane Queue Percentiles

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

#### LANE QUEUE PERCENTILES (VEHICLES)

Lane No.	Deg. Satn x	Percentile Back of Queue (veh)						
		50%	70%	85%	90%	95%	98%	100%
East: Lake Dr								
1	0.051	0.1	0.1	0.2	0.2	0.3	0.3	0.3
North: 10th Ave NW								
1	0.381	1.0	1.2	1.7	2.0	2.4	2.6	2.8
West: Lake Dr								
1	0.663	2.7	3.5	4.9	5.7	6.7	7.4	8.0

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUE PERCENTILES (DISTANCE)

Lane No.	Deg. Satn x	Percentile Back of Queue (feet)						
		50%	70%	85%	90%	95%	98%	100%
East: Lake Dr								
1	0.051	2.6	3.4	4.8	5.6	6.6	7.3	7.8
North: 10th Ave NW								
1	0.381	23.8	30.8	43.4	50.3	59.1	65.7	70.6
West: Lake Dr								
1	0.663	67.0	86.8	122.4	141.8	166.7	185.0	198.9

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

[Go to Table Links \(Top\)](#)

### Lane Stops

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	-- Effective Stop Rate --		Geom. Overall		Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq	Aver. Num. of Cycles to Depart
				he1	he2	hig	h					
East: Lake Dr												
1	0.051	NA	NA	0.07	0.00	0.36	0.43	30.2	0.00	0.0	0.20	0.20
North: 10th Ave NW												
1	0.381	NA	NA	0.03	0.00	0.58	0.61	339.5	0.00	0.0	0.11	0.11
West: Lake Dr												
1	0.663	NA	NA	0.66	0.08	0.10	0.84	610.1	0.17	126.0	0.76	0.94

hig is the average value for all movements in a shared lane  
hqm is average queue move-up rate for all vehicles queued and unqueued

[Go to Table Links \(Top\)](#)

### Flow Rates

#### Origin-Destination Flow Rates (Total)

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

#### TOTAL FLOW RATES for All Movement Classes (veh/h)

From EAST To:			
Turn:	W	N	
	T1	R2	TOT
Flow Rate	16.3	54.3	70.7
%HV (all designations)	0.0	0.0	0.0
From NORTH To:			
Turn:	E	W	
	L2	R2	TOT
Flow Rate	473.9	82.6	556.5
%HV (all designations)	0.0	0.0	0.0
From WEST To:			
Turn:	N	E	
	L2	T1	TOT

Flow Rate	64.1	662.0	726.1
%HV (all designations)	0.0	0.0	0.0

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

### Origin-Destination Flow Rates by Movement Class

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

FLOW RATES for Light Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	16.3	54.3	70.7
Mov Class %	100.0	100.0	100.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	473.9	82.6	556.5
Mov Class %	100.0	100.0	100.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	64.1	662.0	726.1
Mov Class %	100.0	100.0	100.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

### Lane Flow Rates

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

LANE FLOW RATES AT STOP LINE (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Lane 1			
LV	16.3	54.3	70.7
Total	16.3	54.3	70.7
Approach	16.3	54.3	70.7

From NORTH To:	E	W	
Turn:	L2	R2	TOT
-----			
Lane 1			
LV	473.9	82.6	556.5
Total	473.9	82.6	556.5
-----			
Approach	473.9	82.6	556.5
-----			
From WEST To:	N	E	
Turn:	L2	T1	TOT
-----			
Lane 1			
LV	64.1	662.0	726.1
Total	64.1	662.0	726.1
-----			
Approach	64.1	662.0	726.1
-----			

## EXIT LANE FLOW RATES

Movement Class:	LV	HV	TOT
-----			
Exit: EAST			
Lane: 1	1135.9	*	1135.9
Total	1135.9	*	1135.9
-----			
Exit: NORTH			
Lane: 1	118.5	*	118.5
Total	118.5	*	118.5
-----			
Exit: WEST			
Lane: 1	98.9	*	98.9
Total	98.9	*	98.9
-----			
* Movement not allocated to the lane			

## DOWNSTREAM LANE FLOW RATES FOR EXIT ROADS

Movement Class:	LV	HV	TOT
-----			
Exit: EAST			
Lane: 1	1135.9	*	1135.9
Total	1135.9	*	1135.9
-----			
Exit: NORTH			
Lane: 1	118.5	*	118.5
Total	118.5	*	118.5
-----			
Exit: WEST			
Lane: 1	98.9	*	98.9
Total	98.9	*	98.9
-----			
* Movement not allocated to the lane			

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
Unit Time for Volumes = 60 minutes  
Peak Flow Period = 15 minutes  
Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Other

### Parameter Settings Summary

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

\* Basic Parameters:



Intersection Type: Roundabout  
Driving on the right-hand side of the road  
Input data specified in US units  
Model Defaults: US HCM (Customary)  
Peak Flow Period (for performance): 15 minutes  
Unit time (for volumes): 60 minutes.  
SIDRA Standard Delay model used  
HCM Queue Model option used  
Level of Service based on: Delay and v/c (HCM 2010)  
Queue percentile: 95%

[Go to Table Links \(Top\)](#)

## Diagnostics

Site: 4. 10th & Lake - 2026 AM With Project - Single Lane RAB

Site ID:  
Roundabout

### Flow-Capacity Iterations:

Largest change in degree of saturation for any lane = 0.1 %  
Largest change in capacity for any lane = 1 veh/h

Other Diagnostic Messages (if any):

[Go to Table Links \(Top\)](#)

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Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22

Comment Response\2026 10th & Lake RAB.sip7

# MOVEMENT SUMMARY

 **Site: [4. 10th & Lake - 2026 PM With Project - Single Lane RAB]**

Costco Buildings 4 and 5  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
East: Lake Dr											
6	T1	417	0.0	0.707	7.0	LOS A	7.4	184.5	0.69	0.70	35.9
16	R2	450	0.0	0.707	7.0	LOS A	7.4	184.5	0.69	0.70	34.9
Approach		867	0.0	0.707	7.0	LOS A	7.4	184.5	0.69	0.70	35.4
North: 10th Ave NW											
7	L2	23	0.0	0.156	11.4	LOS B	0.9	22.4	0.55	0.63	36.4
14	R2	142	0.0	0.156	5.5	LOS A	0.9	22.4	0.55	0.63	35.2
Approach		165	0.0	0.156	6.3	LOS A	0.9	22.4	0.55	0.63	35.3
West: Lake Dr											
5	L2	283	0.0	0.273	9.8	LOS A	1.7	41.7	0.13	0.58	35.6
2	T1	112	0.0	0.273	3.9	LOS A	1.7	41.7	0.13	0.58	35.5
Approach		395	0.0	0.273	8.1	LOS A	1.7	41.7	0.13	0.58	35.6
All Vehicles		1427	0.0	0.707	7.2	LOS A	7.4	184.5	0.52	0.66	35.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22 Comment Response  
2026 10th & Lake RAB.sip7

DETAILED OUTPUT

 Site: [4. 10th & Lake - 2026 PM With Project - Single Lane RAB]

Costco Buildings 4 and 5  
Roundabout

OUTPUT TABLE LINKS

-  Roundabouts
  - Roundabout Basic Parameters
  - Roundabout Circulating / Exiting Stream Parameters
  - Roundabout Gap Acceptance Parameters
  - Roundabout Flow Rates
-  Movements
  - Intersection Negotiation and Travel Data
  - Movement Capacity and Performance Parameters
  - Fuel Consumption, Emissions and Cost
-  Lanes
  - Lane Performance and Capacity Information
  - Lane, Approach and Intersection Performance
  - Driver Characteristics
  - Lane Delays
  - Lane Queues
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-  Flow Rates
  - Origin-Destination Flow Rates (Total)
  - Origin-Destination Flow Rates by Movement Class
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-  Other
  - Parameter Settings Summary
  - Diagnostics

Roundabouts

Roundabout Basic Parameters  
Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID: Roundabout											
Central Island Diam ft	Circ Width ft	Insc Diam. ft	Entry Radius ft	Entry Angle deg	Circ Lanes	Entry Lanes	Av.Entry Lane Width ft	Appr Dist ft	Prop Upstr	Queued Signal	Extra Bunching %
East: Lake Dr											
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N
North: 10th Ave NW											
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N
West: Lake Dr											
100.0	20.0	140.0	100.0	30.0	1	1	15.00	1600		NA	0.0N
Roundabout Capacity Model: SIDRA Standard											
NA Not Applicable (single Site analysis or unconnected Site in Network analysis).											
N Program option resulted in zero value (single Site analysis or unconnected Site in Network analysis).											

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Roundabout Circulating / Exiting Stream Parameters  
Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	Opng Flow veh/h	HVE pcu/veh	Adj. Flow pcu/h	%Near Lane Only	%Exit Flow Incl.	Cap. Const. Effect	O-D Factor	Aver Speed mph	In-Bunch Headway sec	Prop. Bunched
East: Lake Dr													
W	T1	1	Dominant	283	1.00	283	0.0	0.0	N	0.991	15.6	2.00	0.291
N	R2	1	Dominant	283	1.00	283	0.0	0.0	N	0.991	15.6	2.00	0.291
North: 10th Ave NW													
E	L2	1	Dominant	417	1.00	417	0.0	0.0	N	0.926	24.6	2.00	0.399
W	R2	1	Dominant	417	1.00	417	0.0	0.0	N	0.926	24.6	2.00	0.399
West: Lake Dr													
N	L2	1	Dominant	23	1.00	23	0.0	0.0	N	0.996	15.6	2.00	0.027
E	T1	1	Dominant	23	1.00	23	0.0	0.0	N	0.996	15.6	2.00	0.027

Roundabout Capacity Model: SIDRA Standard

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### Roundabout Gap Acceptance Parameters

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

Dest	Turn	Lane No.	Lane Type	In-Bunch Headway sec	Prop. Bunched	Priority Sharing	HVE for Entry	Critical Gap		Follow-up Headway sec
								Headway sec	Dist ft	
East: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
W	T1	1	Dominant	2.00	0.291	Y	1.00	3.88	88.7	2.33
N	R2	1	Dominant	2.00	0.291	Y	1.00	3.88	88.7	2.33
North: 10th Ave NW										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
E	L2	1	Dominant	2.00	0.399	Y	1.00	3.70	133.8	2.28
W	R2	1	Dominant	2.00	0.399	Y	1.00	3.70	133.8	2.28
West: Lake Dr										
Environment Factor: 1.00										
Entry/Circ. Flow Adjustment: None										
N	L2	1	Dominant	2.00	0.027	Y	1.00	4.27	97.4	2.43
E	T1	1	Dominant	2.00	0.027	Y	1.00	4.27	97.4	2.43

Roundabout Capacity Model: SIDRA Standard

Priority sharing means Follow-up Headway plus Intra-bunch Headway is larger than the Critical Gap.

Dist (Distance): Spacing, i.e. distance between the front ends of two successive vehicles across all lanes in the circulating or exiting stream

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### Roundabout Flow Rates

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

#### CIRCULATING LANE FLOW RATES

Lane No.	Circulating Flow Rate		
	veh/h	pcu/h	Percent

East: Lake Dr

1	283	283	100.0%
Total	283	283	

North: 10th Ave NW			
1	417	417	100.0%
Total	417	417	

West: Lake Dr			
1	23	23	100.0%
Total	23	23	

The SIDRA Standard roundabout capacity model option is in use.  
This model takes into account the total circulating flow as well as the effect of flow distribution in circulating lanes on the entry capacity results.

#### APPROACH LANE FLOW RATES

Lane No.	Approach Flows (veh/h)		
	Out	To Downst	Total

East: Lake Dr			
1	450	417	867
Total	450	417	867

North: 10th Ave NW			
1	142	23	165
Total	142	23	165

West: Lake Dr			
1	112	283	395
Total	112	283	395

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## Movements

### Intersection Negotiation and Travel Data

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

#### TRAVEL SPEED, TRAVEL DISTANCE AND TRAVEL TIME

From Approach	To Exit	Turn	Running Speed mph	Travel Speed mph	Travel Distance ft	Travel Time s	Total Dem Flows veh-mi/h	Travel Distance Arv Flows veh-mi/h	Tot.Trav. Time veh-h/h
East: Lake Dr									
	West	T1	35.9	35.9	3292.7#	62.5#	260.3	260.3	7.2
	North	R2	34.9	34.9	3292.7#	64.4#	280.6	280.6	8.0
North: 10th Ave NW									
	East	L2	36.4	36.4	3278.0#	61.4#	14.2	14.2	0.4
	West	R2	35.2	35.2	3278.0#	63.6#	88.4	88.4	2.5
West: Lake Dr									
	North	L2	35.6	35.6	3401.3#	65.1#	182.1	182.1	5.1
	East	T1	35.5	35.5	3401.3#	65.4#	72.1	72.1	2.0
ALL VEHICLES:			35.4	35.4	3321.0#	63.9#	897.7	897.7	25.3

"Running Speed" is the average speed excluding stopped periods.

Travel Time values include cruise times and intersection delays including acceleration, deceleration and idling delays.

# Travel Distance and Travel Time values include travel on the External Exit section based on the Exit Distance or user-specified Downstream Distance value as applicable.

#### INTERSECTION NEGOTIATION DATA

From Approach	To Exit	Turn	Negn Radius ft	Negn Speed mph	Negn Dist. ft	Appr. Dist. ft	Exit Dist. ft	Downstr. Dist. ft
-----								
East: Lake Dr								
	West	T1	194.9	24.6	134.4	1600	488	NA
	North	R2	119.4	20.5	54.0	1600	488	NA
-----								
North: 10th Ave NW								
	East	L2	58.0	15.6	227.8	1600	488	NA
	West	R2	119.4	20.5	54.0	1600	488	NA
-----								
West: Lake Dr								
	North	L2	58.0	15.6	227.8	1600	488	NA
	East	T1	194.9	24.6	134.4	1600	488	NA
-----								
Maximum Negotiation (Design) Speed = 30.0 mph								
NA Downstream Distance does not apply if:								
- Exit is an internal leg of a network								
- "Program" option was specified								
- Distance specified was less than the Exit Negotiation Distance								
- Distance specified was greater than the exit leg length								
MOVEMENT SPEEDS AND GEOMETRIC DELAY								
-----								
Mov ID	Turn	App. Speeds		Exit Speeds		Queue Move-up Speed mph	Geom Delay sec	
		Cruise mph	Negn mph	Negn mph	Cruise mph			
-----								
East: Lake Dr								
6	T1	40.0	24.6	24.6	40.0	28.3	3.8	
16	R2	40.0	20.5	20.5	40.0	28.3	3.8	
-----								
North: 10th Ave NW								
7	L2	40.0	15.6	15.6	40.0	24.7	9.7	
14	R2	40.0	20.5	20.5	40.0	24.7	3.8	
-----								
West: Lake Dr								
5	L2	40.0	15.6	15.6	40.0	29.2	9.7	
2	T1	40.0	24.6	24.6	40.0	29.2	3.8	
-----								

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## Movement Capacity and Performance Parameters

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

### MOVEMENT CAPACITY PARAMETERS

Mov ID	Turn	Mov Cl.	Arv Flow veh/h	Opng Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Deg. Satn x
East: Lake Dr									
6	T1	#	417	283	283	590	0.85	20	0.707*
16	R2	#	450	283	283	637	0.85	20	0.707*
North: 10th Ave NW									
7	L2	#	23	417	417	147	0.85	446	0.156
14	R2	#	142	417	417	915	0.85	446	0.156
West: Lake Dr									
5	L2	#	283	23	23	1037	0.85	212	0.273
2	T1	#	112	23	23	411	0.85	212	0.273

\* Maximum degree of saturation

# Combined Movement Capacity parameters are shown for all Movement Classes.

## MOVEMENT PERFORMANCE

Mov ID	Turn	Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-mi/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (mph)
East: Lake Dr										
6	T1	0.81	0.97	7.0	0.70	290.9	11.90	260.3	7.2	35.9
16	R2	0.88	1.06	7.0	0.70	313.7	12.61	280.6	8.0	34.9
North: 10th Ave NW										
7	L2	0.07	0.09	11.4	0.63	14.4	0.87	14.2	0.4	36.4
14	R2	0.22	0.26	5.5	0.63	89.6	3.28	88.4	2.5	35.2
West: Lake Dr										
5	L2	0.77	0.93	9.8	0.58	163.7	6.90	182.1	5.1	35.6
2	T1	0.12	0.15	3.9	0.58	64.8	2.96	72.1	2.0	35.5

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## Fuel Consumption, Emissions and Cost

Site: 4. 10th &amp; Lake - 2026 PM With Project - Single Lane RAB

 Site ID:  
 Roundabout

## FUEL CONSUMPTION, EMISSIONS AND COST (TOTAL)

Mov ID	Turn	Cost Total \$/h	Fuel Total gal/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
East: Lake Dr							
6	T1	98.90	9.2	81.8	0.11	0.008	0.027
16	R2	106.63	9.9	88.2	0.12	0.008	0.029
		205.52	19.1	170.1	0.23	0.016	0.057
North: 10th Ave NW							
7	L2	5.46	0.5	4.5	0.01	0.000	0.001
14	R2	34.07	3.2	28.1	0.04	0.003	0.009
		39.53	3.7	32.6	0.04	0.003	0.011
West: Lake Dr							
5	L2	71.11	6.4	56.6	0.07	0.005	0.018
2	T1	28.17	2.5	22.4	0.03	0.002	0.007
		99.28	8.9	79.0	0.10	0.007	0.025
INTERSECTION:		344.33	31.7	281.7	0.38	0.026	0.093

## FUEL CONSUMPTION, EMISSIONS AND COST (RATE)

Mov ID	Turn	Cost Rate \$/mi	Fuel Eff. mpg	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
East: Lake Dr							
6	T1	0.24	28.3	195.4	0.27	0.018	0.065
16	R2	0.24	28.3	195.4	0.27	0.018	0.065
		0.24	28.3	195.4	0.27	0.018	0.065
North: 10th Ave NW							
7	L2	0.24	28.0	197.5	0.27	0.018	0.066
14	R2	0.24	28.0	197.5	0.27	0.018	0.066
		0.24	28.0	197.5	0.27	0.018	0.066
West: Lake Dr							
5	L2	0.24	28.6	193.0	0.26	0.017	0.062

2	Tl	0.24	28.6	193.0	0.26	0.017	0.062
		0.24	28.6	193.0	0.26	0.017	0.062
INTERSECTION:		0.24	28.4	195.0	0.26	0.018	0.064

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Lanes

Lane Performance and Capacity Information  
Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

LANE PERFORMANCE

						Q u e u e		
Lane	Flow	Cap	Deg.	Aver.	Eff.	95% Back		Lane
No.	veh/h	veh/h	Satn	Delay	Stop	-----		Length
			x	sec	Rate	veh	ft	ft
East: Lake Dr								
1	867	1227	0.707	7.0	0.70	7.4	184.5	1600.0
North: 10th Ave NW								
1	165	1061	0.156	6.3	0.63	0.9	22.4	1600.0
West: Lake Dr								
1	395	1448	0.273	8.1	0.58	1.7	41.7	1600.0

LANE FLOW AND CAPACITY INFORMATION

Lane No.	Total Arv Flow (veh/h)	Min Cap veh/h	Tot Cap veh/h	Deg. Satn x	Lane Util %
East: Lake Dr					
1	867	150	1227	0.707	100
North: 10th Ave NW					
1	165	150	1061	0.156	100
West: Lake Dr					
1	395	150	1448	0.273	100

The capacity values of Continuous Lanes are obtained by adjusting the basic saturation flow for lane width, grade, movement class and turning vehicle effects. Saturation flow scale applies if specified.

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Lane, Approach and Intersection Performance  
Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

Lane No.	Arrival Flow (veh/h)	%HV	Adj. Basic Satf.	Deg Sat x	Aver. Delay sec	Longest Queue ft	Lane Length ft
East: Lake Dr							
1	867	0		0.707	7.0	184	1600
	867	0		0.707	7.0	184	
North: 10th Ave NW							



1	165	0	0.156	6.3	22	1600
	165	0	0.156	6.3	22	
West: Lake Dr						
1	395	0	0.273	8.1	42	1600
	395	0	0.273	8.1	42	
=====						
ALL VEHICLES						
	Total	%	Max	Aver.	Max	
	Flow	HV	X	Delay	Queue	
	1427	0	0.707	7.2	184	
=====						
Peak flow period = 15 minutes.						
Queue values in this table are 95% queue (feet)						
Note: Basic Saturation Flows at roundabouts or sign-controlled intersections apply only to continuous lanes.						

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### Driver Characteristics

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

Lane No.	Satn Speed mph	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing ft	Average Queue Space ft	Driver Response Time sec
East: Lake Dr						
1	22.5	1544	2.33	76.83	25.00	1.57
North: 10th Ave NW						
1	19.8	1578	2.28	66.19	25.00	1.42
West: Lake Dr						
1	18.1	1482	2.43	64.59	25.00	1.49

Saturation Flow and Saturation Headway are derived from follow-up headway.

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### Lane Delays

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

#### LANE DELAYS

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Stop-line Delay			Delay (seconds/veh)					
				1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing dq	Stopd MvUp dqm	(Idle) di	Geom dig	Control dic
East: Lake Dr												
1	0.707	NA	NA	2.3	0.9	3.2	3.7	0.1	0.1	0.0	3.8	7.0
North: 10th Ave NW												
1	0.156	NA	NA	1.6	0.0	1.6	2.3	0.0	0.0	0.0	4.7	6.3
West: Lake Dr												
1	0.273	NA	NA	0.1	0.0	0.1	0.6	0.0	0.0	0.0	8.0	8.1

SIDRA Standard Delay Model is used. Control Delay is the sum of Stop-line Delay and Geometric Delay.

dSL: Stop-line delay (=d1+d2)

dn: Average stop-start delay for all vehicles queued and unqueued

dq: Queuing delay (the part of the stop-line delay that includes stopped delay and queue move-up delay)

dqm: Queue move-up delay

di: Stopped delay (stopped (idling) time at near-zero speed)  
 dig: Geometric delay  
 dic: Control delay

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### Lane Queues

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

#### LANE QUEUES (VEHICLES)

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (veh)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
	x				Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: Lake Dr														
1	0.707	NA	NA	0.3	2.5	0.5	3.0	7.4	0.05	0.12	0.0	NA	0.8	1.4
North: 10th Ave NW														
1	0.156	NA	NA	0.0	0.4	0.0	0.4	0.9	0.01	0.01	0.0	NA	0.1	0.1
West: Lake Dr														
1	0.273	NA	NA	0.0	0.7	0.0	0.7	1.7	0.01	0.03	0.0	NA	0.0	0.0

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUES (DISTANCE)

Lane No.	Deg. Satn x	% Arv During Green	Prog. Factor	Ovrfl. Queue No	Back of Queue (ft)				Queue Stor. Ratio		Prob. Block %	Prob. SL Ov. %	Cyc-Av. Queue	
					Nb1	Nb2	Nb	95%	Av.	95%			Nc	95%
East: Lake Dr														
1	0.707	NA	NA	6.4	62.1	12.1	74.2	184.5	0.05	0.12	0.0	NA	19.2	34.9
North: 10th Ave NW														
1	0.156	NA	NA	0.0	9.0	0.0	9.0	22.4	0.01	0.01	0.0	NA	1.9	3.4
West: Lake Dr														
1	0.273	NA	NA	0.0	16.8	0.0	16.8	41.7	0.01	0.03	0.0	NA	0.3	0.5

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

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### Lane Queue Percentiles

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

#### LANE QUEUE PERCENTILES (VEHICLES)

Lane No.	Deg. Satn x	Percentile Back of Queue (veh)						
		50%	70%	85%	90%	95%	98%	100%
East: Lake Dr								
1	0.707	3.0	3.8	5.4	6.3	7.4	8.2	8.8
North: 10th Ave NW								
1	0.156	0.4	0.5	0.7	0.8	0.9	1.0	1.1
West: Lake Dr								
1	0.273	0.7	0.9	1.2	1.4	1.7	1.9	2.0

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

#### LANE QUEUE PERCENTILES (DISTANCE)

Lane No.	Deg. Satn	Percentile Back of Queue (feet)						
	x	50%	70%	85%	90%	95%	98%	100%
East: Lake Dr								
1	0.707	74.2	96.1	135.5	156.9	184.5	204.8	220.1
North: 10th Ave NW								
1	0.156	9.0	11.6	16.4	19.0	22.4	24.8	26.7
West: Lake Dr								
1	0.273	16.8	21.7	30.6	35.5	41.7	46.3	49.8

SIDRA Standard models are used for Back of Queue estimation since HCM only gives Cycle-Average Queues for unsignalised intersections.

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### Lane Stops

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

Lane No.	Deg. Satn	% Arv During Green	Prog. Factor	-- Effective Stop Rate --		Geom. Overall		Total Stops	Queue Move-up Rate	Total Queue Move-ups	Prop. Queued	Aver. Num. of Cycles to Depart
	x			he1	he2	hig	h	H	hqm	Hqm	pq	
East: Lake Dr												
1	0.707	NA	NA	0.53	0.04	0.13	0.70	604.6	0.08	66.1	0.69	0.77
North: 10th Ave NW												
1	0.156	NA	NA	0.40	0.00	0.23	0.63	103.9	0.00	0.0	0.55	0.55
West: Lake Dr												
1	0.273	NA	NA	0.04	0.00	0.54	0.58	228.5	0.00	0.0	0.13	0.13

hig is the average value for all movements in a shared lane

hqm is average queue move-up rate for all vehicles queued and unqueued

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### Flow Rates

#### Origin-Destination Flow Rates (Total)

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

#### TOTAL FLOW RATES for All Movement Classes (veh/h)

From EAST To:			
Turn:	W	N	
	T1	R2	TOT
Flow Rate	417.4	450.0	867.4
%HV (all designations)	0.0	0.0	0.0
From NORTH To:			
Turn:	E	W	
	L2	R2	TOT
Flow Rate	22.8	142.4	165.2
%HV (all designations)	0.0	0.0	0.0
From WEST To:			
Turn:	N	E	
	L2	T1	TOT

Flow Rate	282.6	112.0	394.6
%HV (all designations)	0.0	0.0	0.0

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

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### Origin-Destination Flow Rates by Movement Class

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

FLOW RATES for Light Vehicles (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Flow Rate	417.4	450.0	867.4
Mov Class %	100.0	100.0	100.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From NORTH To:	E	W	
Turn:	L2	R2	TOT
Flow Rate	22.8	142.4	165.2
Mov Class %	100.0	100.0	100.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0
From WEST To:	N	E	
Turn:	L2	T1	TOT
Flow Rate	282.6	112.0	394.6
Mov Class %	100.0	100.0	100.0
Flow Scale	1.00	1.00	-
Peak Flow Factor	0.92	0.92	-
Residual Demand	0.0	0.0	0.0

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
 Unit Time for Volumes = 60 minutes  
 Peak Flow Period = 15 minutes  
 Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
 Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

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### Lane Flow Rates

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

LANE FLOW RATES AT STOP LINE (veh/h)

From EAST To:	W	N	
Turn:	T1	R2	TOT
Lane 1			
LV	417.4	450.0	867.4
Total	417.4	450.0	867.4
Approach	417.4	450.0	867.4

From NORTH To:	E	W	
Turn:	L2	R2	TOT
-----			
Lane 1			
LV	22.8	142.4	165.2
Total	22.8	142.4	165.2
-----			
Approach	22.8	142.4	165.2
-----			
From WEST To:	N	E	
Turn:	L2	T1	TOT
-----			
Lane 1			
LV	282.6	112.0	394.6
Total	282.6	112.0	394.6
-----			
Approach	282.6	112.0	394.6
-----			

## EXIT LANE FLOW RATES

Movement Class:	LV	HV	TOT
-----			
Exit: EAST			
Lane: 1	134.8	*	134.8
Total	134.8	*	134.8
-----			
Exit: NORTH			
Lane: 1	732.6	*	732.6
Total	732.6	*	732.6
-----			
Exit: WEST			
Lane: 1	559.8	*	559.8
Total	559.8	*	559.8
-----			
* Movement not allocated to the lane			

## DOWNSTREAM LANE FLOW RATES FOR EXIT ROADS

Movement Class:	LV	HV	TOT
-----			
Exit: EAST			
Lane: 1	134.8	*	134.8
Total	134.8	*	134.8
-----			
Exit: NORTH			
Lane: 1	732.6	*	732.6
Total	732.6	*	732.6
-----			
Exit: WEST			
Lane: 1	559.8	*	559.8
Total	559.8	*	559.8
-----			
* Movement not allocated to the lane			

Flow rates shown above are Arrival Flow Rates (veh/h) based on the following input specifications:  
Unit Time for Volumes = 60 minutes  
Peak Flow Period = 15 minutes  
Effects of Volume Factors (Peak Flow Factor, Flow Scale, Growth Rate) are included.  
Arrival Flow Rates may be less than Demand Flow Rates if capacity constraint applies in network analysis.

[Go to Table Links \(Top\)](#)

## Other

### Parameter Settings Summary

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

\* Basic Parameters:

Intersection Type: Roundabout  
Driving on the right-hand side of the road  
Input data specified in US units  
Model Defaults: US HCM (Customary)  
Peak Flow Period (for performance): 15 minutes  
Unit time (for volumes): 60 minutes.  
SIDRA Standard Delay model used  
HCM Queue Model option used  
Level of Service based on: Delay and v/c (HCM 2010)  
Queue percentile: 95%

[Go to Table Links \(Top\)](#)

## Diagnostics

Site: 4. 10th & Lake - 2026 PM With Project - Single Lane RAB

Site ID:  
Roundabout

### Flow-Capacity Iterations:

Largest change in degree of saturation for any lane = 0.2 %  
Largest change in capacity for any lane = 2 veh/h

Other Diagnostic Messages (if any):

[Go to Table Links \(Top\)](#)

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Organisation: TRANSPORTATION SOLUTIONS INC | Processed: Thursday, March 15, 2018 8:57:36 AM

Project: C:\Users\jakep\Dropbox (TSI)\TSI Projects\2016\216055 Costco HQ 2017 Site Plan, Access, Parking\LOS\2018-02-22

Comment Response\2026 10th & Lake RAB.sip7

### Sight Distance Analysis



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www.tsinv.com

June 7, 2018

Sheldon Lynne  
Public Works Engineering Director  
City of Issaquah Public Works Engineering Department  
1775 12th Avenue NW  
Issaquah, WA 98027

Subject: Costco Home Office Buildings 4 and 5  
Intersection Sight Distance Deviation from Standard

This report supports a deviation request from the City of Issaquah's Intersection Sight Distance Triangle standards. Specifically, this deviation is from the sight-line setback requirements from the Public Works Standards.

### **Context Setting**

Three new driveways are proposed with development of Buildings 4 and 5. Building 4 includes a "north" driveway, shared with the Trading Building and across the "north" driveway to Building 5. Building 5 also includes a "south" driveway, at Costco's west property line.

Exhibits 1-7 show the stopping and intersection sight distances at the south driveway of Building 5, north driveway of Building 5, and north driveway of Building 4. The exhibits respond to City of Issaquah staff comments on the September 2017 Traffic Analysis Costco Home Office Buildings 4 and 5.

Exhibit 5 shows that intersection sight distance north of the north driveway of Buildings 5 is limited due to the horizontal curvature of Lake Drive combined with the location of the northwest corner of the new building. The City of Issaquah's current Urban Design Standards require new buildings to be no further than 10' away from the property line. This standard was used to locate Buildings 4 and 5, and the ultimate building and driveway locations, as shown in the attached exhibits, were reviewed by Issaquah staff. Exhibit 5 shows that the 280' intersection sight distance requirement for a design speed of 25 mph is not satisfied. Exhibit 7 shows that there is approximately 240' of available intersection sight distance north of the driveway, which is 40' less than the intersection sight distance requirement. We request the City of Issaquah allow a deviation from their sight distance standards for the north driveway of Building 5. The technical analysis that follows will show that within the context of Costco's campus setting the driveway location is reasonable.

Exhibits 2-6 show that drivers can see obstructions or opposing drivers between the driveways and the future roundabout at Lake Drive and SE 62nd Street. For purposes of this analysis, the sightlines between the driveways and roundabout are reasonable. The roundabout will slow vehicle speeds approaching the driveway. Also, the driveways meet the City of Issaquah's spacing requirements and, as shown in the June 2018 traffic analysis, vehicle queues are not forecast to adversely impact the roundabout and adjacent driveways.

### **Standard**

The April 2015 City of Issaquah/Costco Wholesale Corporation Development Agreement (Development Agreement) between the City of Issaquah and Costco states that:



*“With each building permit submittal for Future Development, Costco shall provide a traffic analysis in a form acceptable to the City that evaluates driveway and street operations anticipated to be affected by Future Development under consideration. Any City request for additional driveway and/or street operations improvements shall be supported by this traffic analysis and shall be the minimum necessary to ensure safety and functional operation of the street system in the immediate vehicle of the proposed Future Development.”*

The City of Issaquah Department of Public Works Street Standards (Transportation), October 15, 2010, section C, Intersection and Driveway Sight Distance Triangles defines the sight distance standard. The except and table below define the standard:

**1. Sight-Line Setback: Minor Street/Major Through Street**

Intersections included in this group are those controlled by a stop sign or flashing red signal for the minor street and amber, green or no control on the major street. Private non-residential and multifamily access points (driveways) used by the public entering any City street are also included in this group.

The sight-line setbacks are defined in the Standard Details are lines joining a point in the center of a minor street approach lane 14.5 feet back from the edge of the through-street traveled way to points in the centers of through-street approach lanes which are back from the center of the intersection the distances listed in the following table:

Design Speed (mph) (Major Street)	Distance from Center of Intersection (Major Street)	
	Left Turning (ft)	Right Turning (ft)
45	500	430
40	445	385
35	390	335
30	335	290
25	280	240

The speed limit on Lake Drive and SE 62nd Street, in Pickering Place, is 25 mph. Referencing the *National Association of Transportation Officials Urban Street Design Guide*, proactive urban street design recommends that the roadway’s target speed equal the design speed equal the posted speed; hence, the design speed on Pickering Place roadways is assumed to be 25 mph. The sight-line setback standard for a 25-mph design speed is 280 feet.

The City of Issaquah standards reference both the *WSDOT Design Manual* and *AASHTO Green Book* for sight distance triangle guidance. The AASHTO Green Book provides more in-depth context of sight distance.

For this analysis, the sight-line setback defined by the City of Issaquah is referenced herein as the intersection sight distance standard. The AASHTO Green Book provide context for this standard for their Case B1 – Left Turn from the Minor Road.

### **Background**

Section 9.5 Intersection Sight Distance of the AASHTO Green Book states that:

*“If the available sight distance for an entering or crossing vehicle is at least equal to the appropriate stopping sight distance for the major road, then drivers have sufficient sight distance to anticipate and avoid collisions. However, in some cases, a major-road vehicle may need to stop or slow to accommodate the maneuver by a minor-road vehicle. To enhance traffic operations, intersection sight distances that exceed stopping sight distances are desirable along the major road.”*

**Justification**

As stated above, to meet the City of Issaquah's Urban Design Standards, the face of the building is offset 10' from the property line.

Exhibit 5 illustrates the intersection sight distance for a vehicle approaching the north driveway of Building 5 from the north. The building façade encroaches into the 280' (intersection) sightline.

The available intersection sight distance is 240' (see Exhibit 6). AASHTO and WSDOT note a driver will creep their vehicle up to the edge of the travel-way to see oncoming traffic. Reducing the 14.5' setback from the edge of the vehicle travel-way to 10 feet will increase sight distance to 260', but still fall just short of the 280' requirement.

The required stopping sight distance at the north driveway of Building 5, is 115'. Exhibit 2 shows that stopping sight distance is adequate at the north driveway.

From AASHTO guidelines, with sufficient stopping sight distance on Lake Drive, drivers have sufficient sight distance to anticipate and avoid collisions at the driveway.


Costco will trim and maintain vegetation limit appurtenances within the sightlines to maximize the available sight distances.

The location of the driveway, across the north driveway to Building 4 is preferred to reduce left turning conflicts into and out of nearby driveways. Shifting the driveway north, introduces the potential for left turning conflicts into and out of nearby driveways. Shifting the driveway south does will support the intersection spacing requirement (200') for the adjacent roundabout.

The queue analysis, refer to the June 2018 Traffic Study, does not identify any adverse queue impacts at this driveway location.

Based on the above conclusions, a deviation is reasonable to allow the building to support the City of Issaquah's Urban Design Standards and safe access to Building 5.

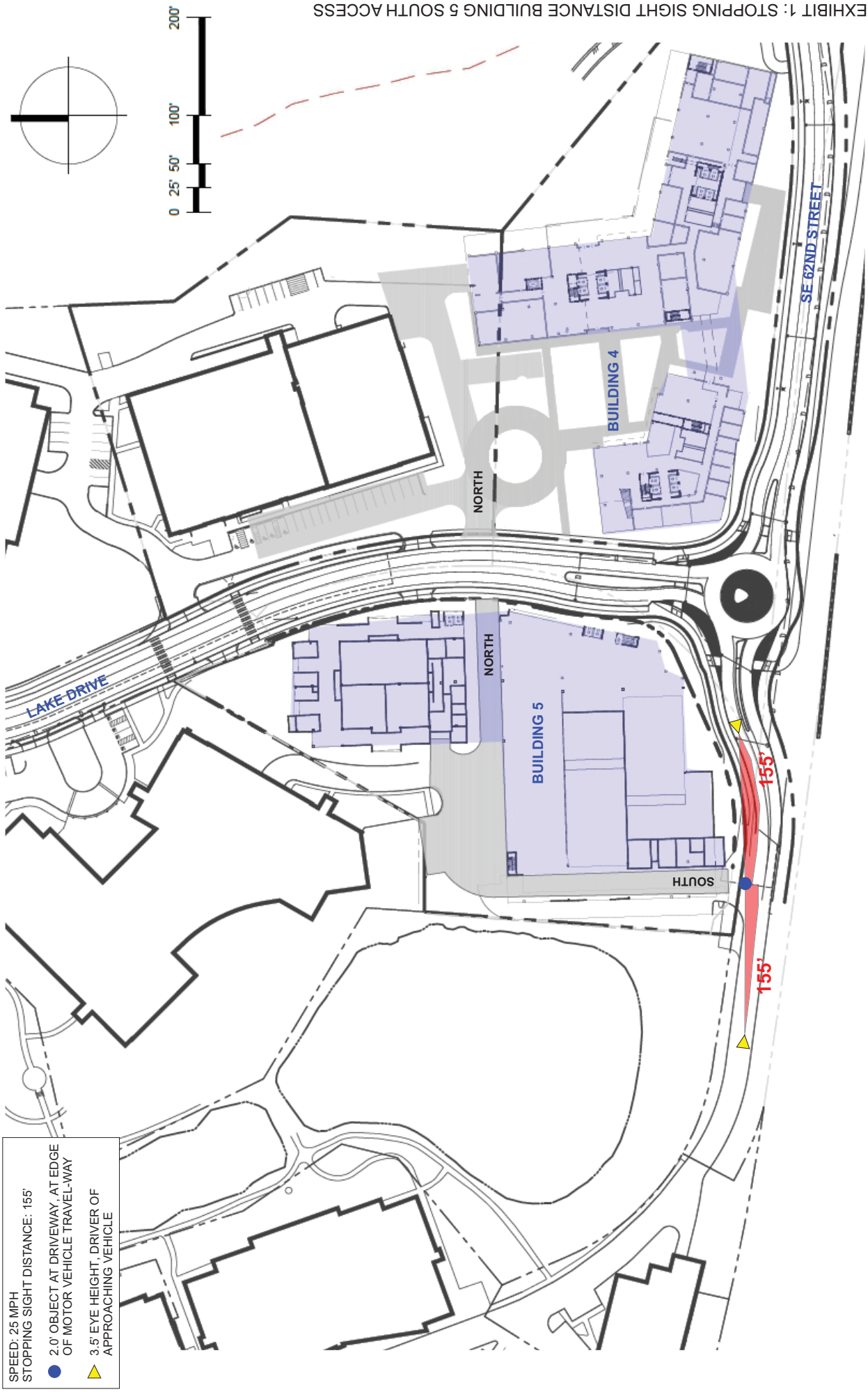
Thank you and sincerely,  
**Transportation Solutions, Inc.**

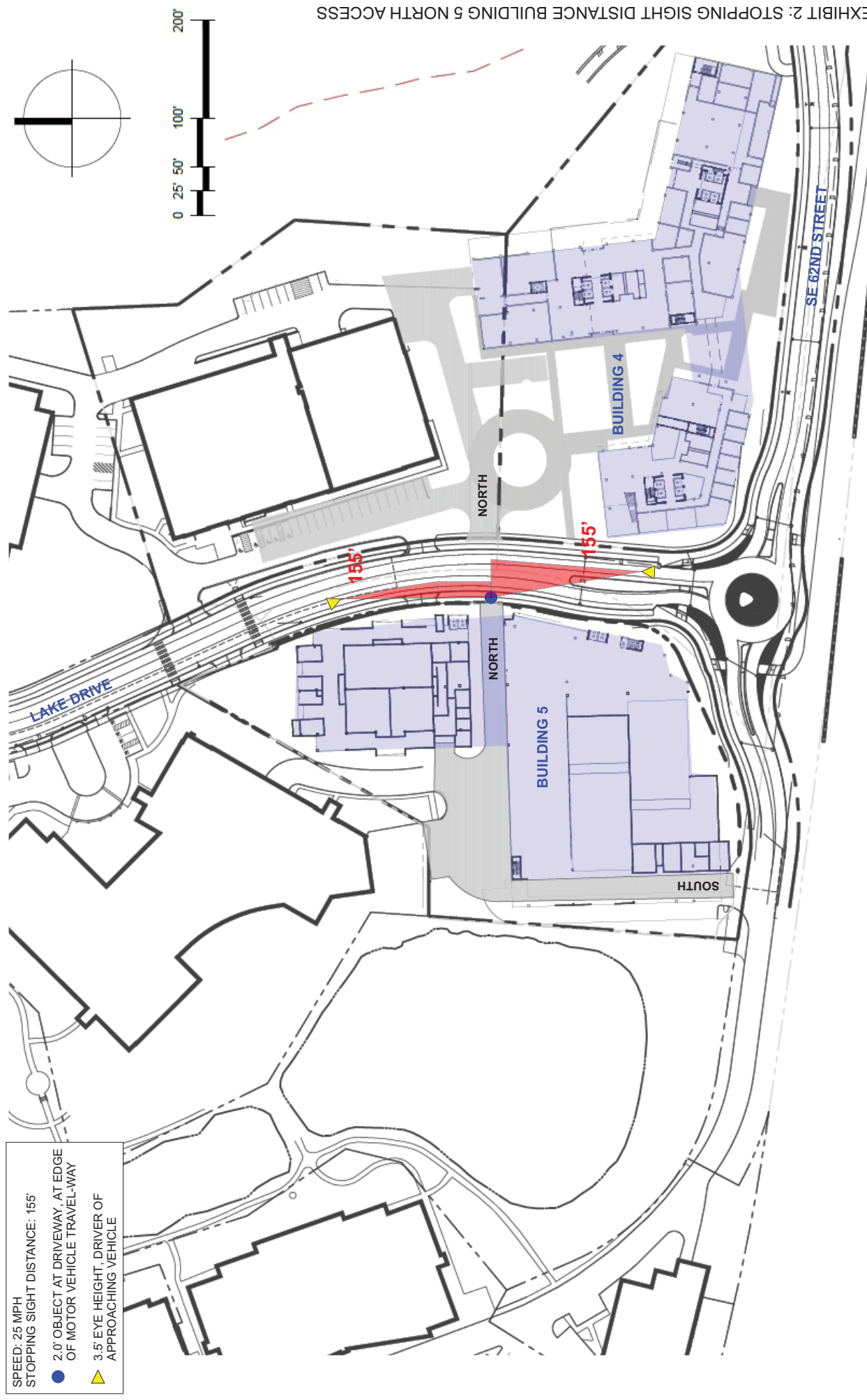


Jeffrey P. K. Hee, PE  
Senior Transportation Engineer



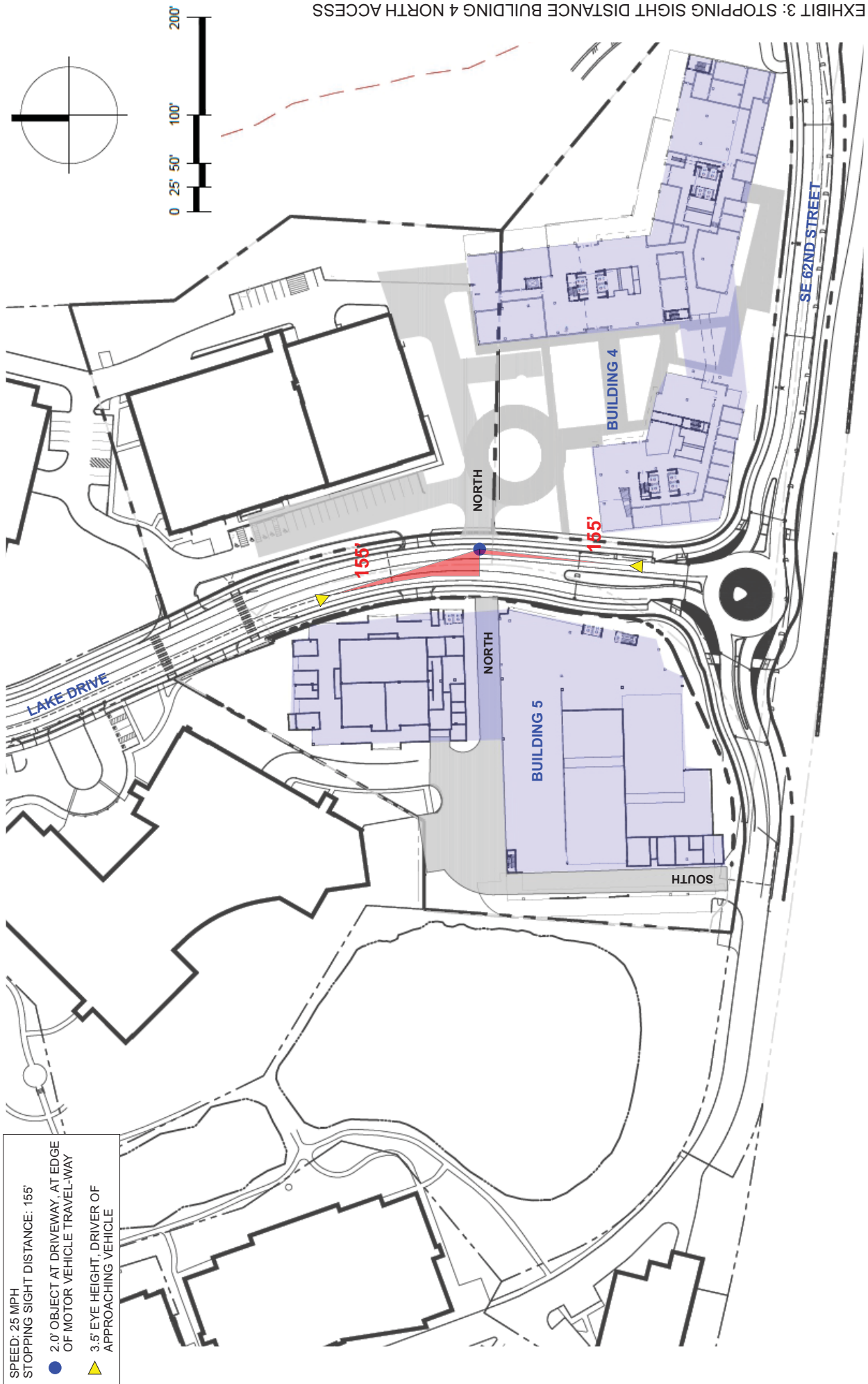
EXHIBIT 1: STOPPING SIGHT DISTANCE BUILDING 5 SOUTH ACCESS

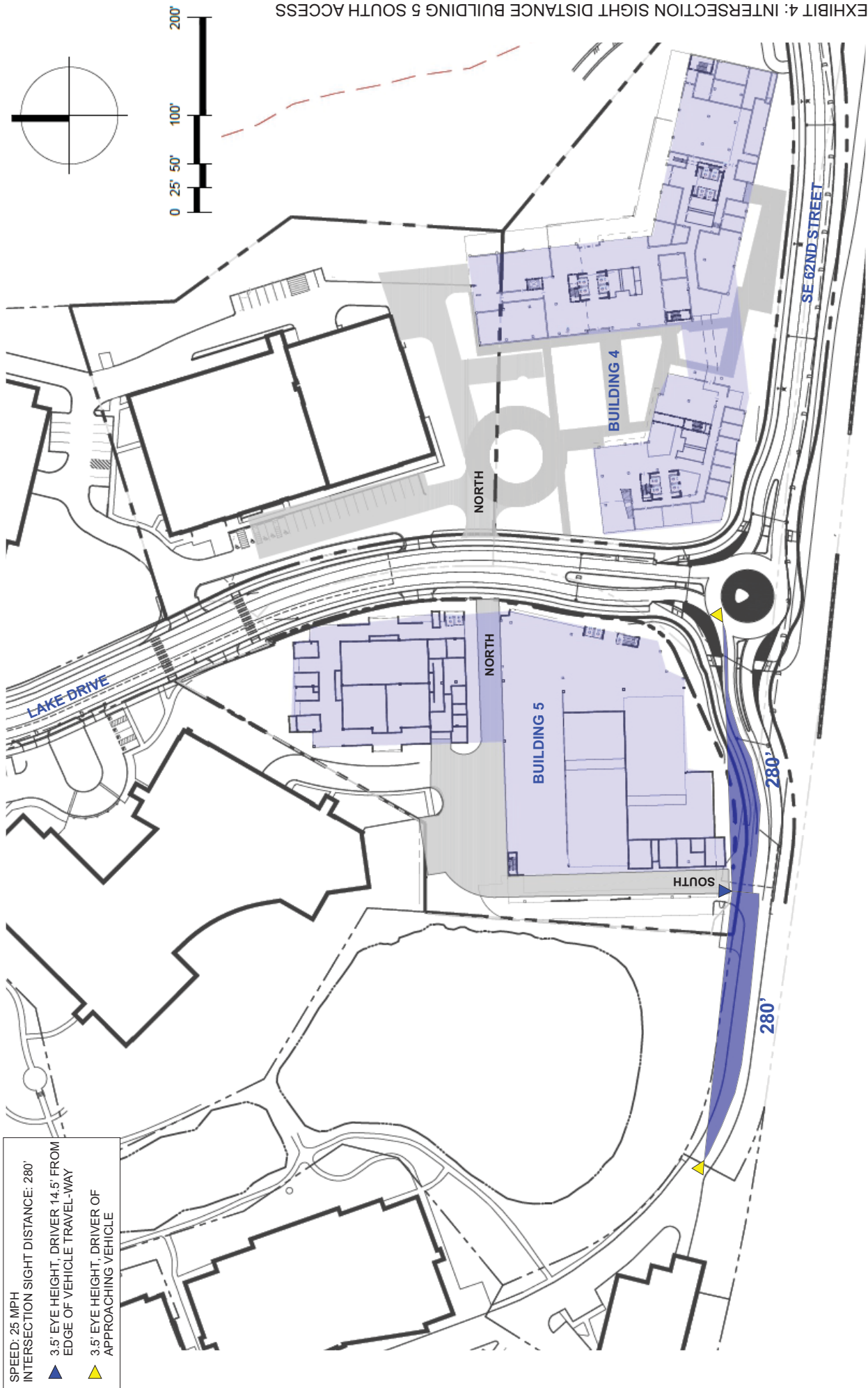




SPEED: 25 MPH  
STOPPING SIGHT DISTANCE: 155'  
● 2.0' OBJECT AT DRIVEWAY, AT EDGE  
OF MOTOR VEHICLE TRAVEL-WAY  
▲ 3.5' EYE HEIGHT, DRIVER OF  
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July 11, 2018

Sheldon Lynne  
Public Works Engineering Director  
City of Issaquah Public Works Engineering Department  
1775 12th Avenue NW  
Issaquah, WA 98027

Subject: Costco Home Office Buildings 4 and 5  
Sight Distance Analysis Update

Dear Mr. Lynne,

On behalf of Costco Wholesale, we would like to formally withdraw our request for a deviation from City of Issaquah's sight distance standards. On June 7, 2018, TSI reviewed the sight distance at the proposed driveways based on an outdated site plan. The site plan was updated and in-turn the sight distance exhibits were updated to show that the current site plan satisfies the City of Issaquah's requirements. The stopping and intersection sight distance exhibits, with the current site plan, are attached for reference.

Attached is the original deviation request dated June 7, 2018.

If you have any questions, please contact me at your convenience.

Thank you and sincerely,  
**Transportation Solutions, Inc.**

A handwritten signature in black ink, appearing to read "J.P.K. Hee", written in a cursive style.

Jeffrey P. K. Hee, PE  
Senior Transportation Engineer



SITELINE STUDY, BUILDING 5

SCALE: 1" = 20'

Exhibit 1



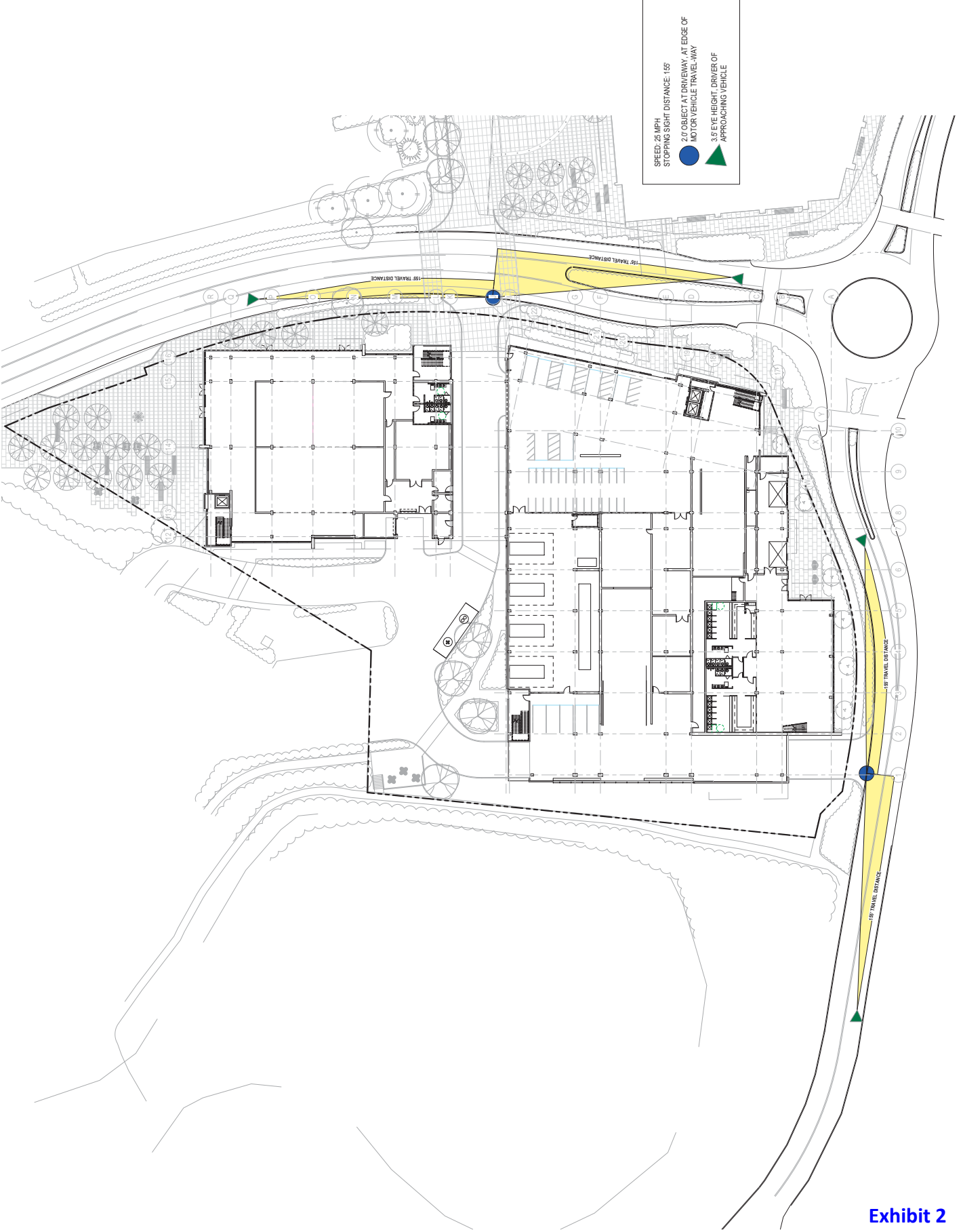


Exhibit 2

SITELINE STOPPING BUILDING 5

SCALE: 1"=30'



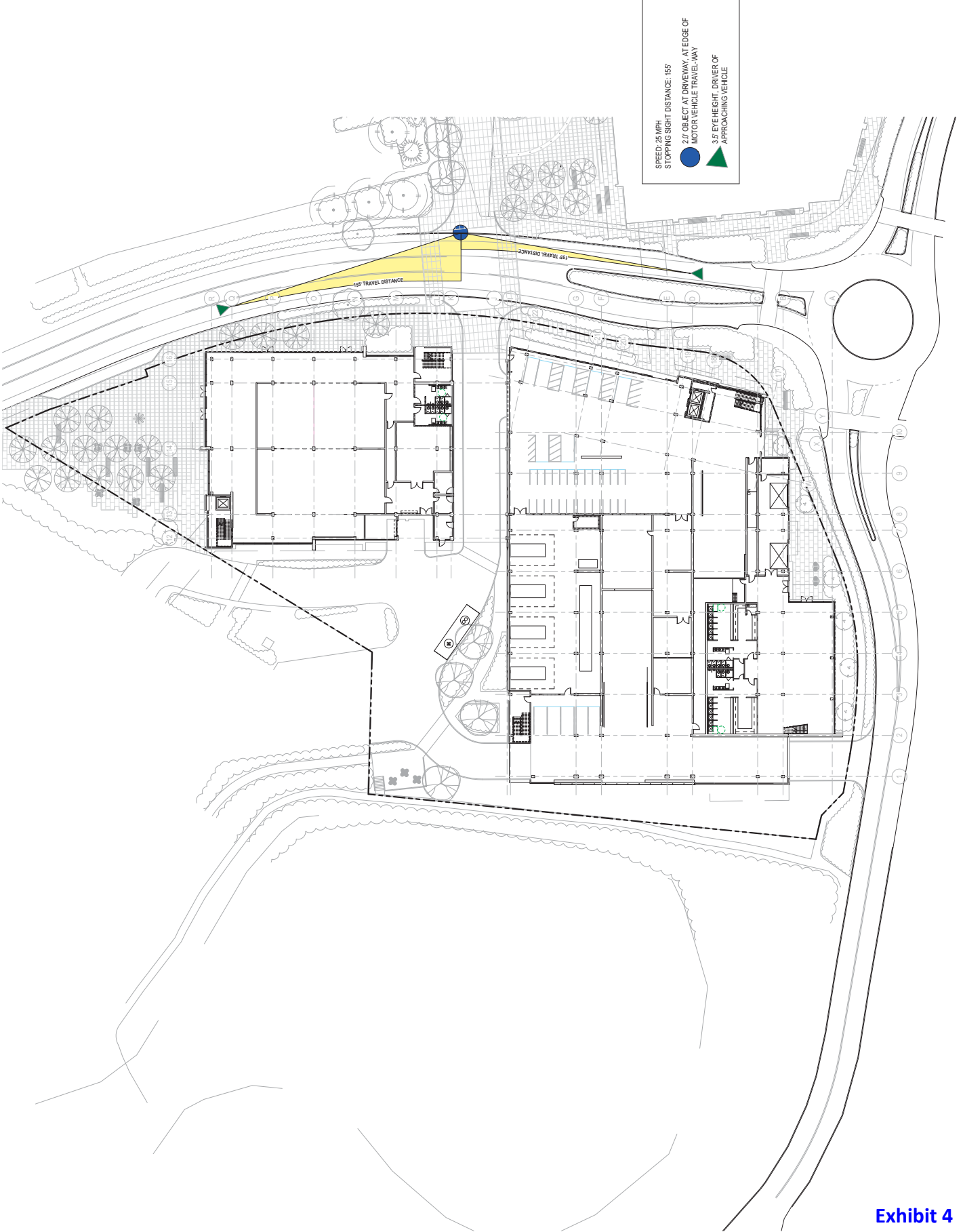


Exhibit 4

SITELINE STOPPING, BUILDING 4

SCALE: 1"=20'



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June 7, 2018

Sheldon Lynne  
Public Works Engineering Director  
City of Issaquah Public Works Engineering Department  
1775 12th Avenue NW  
Issaquah, WA 98027

Subject: Costco Home Office Buildings 4 and 5  
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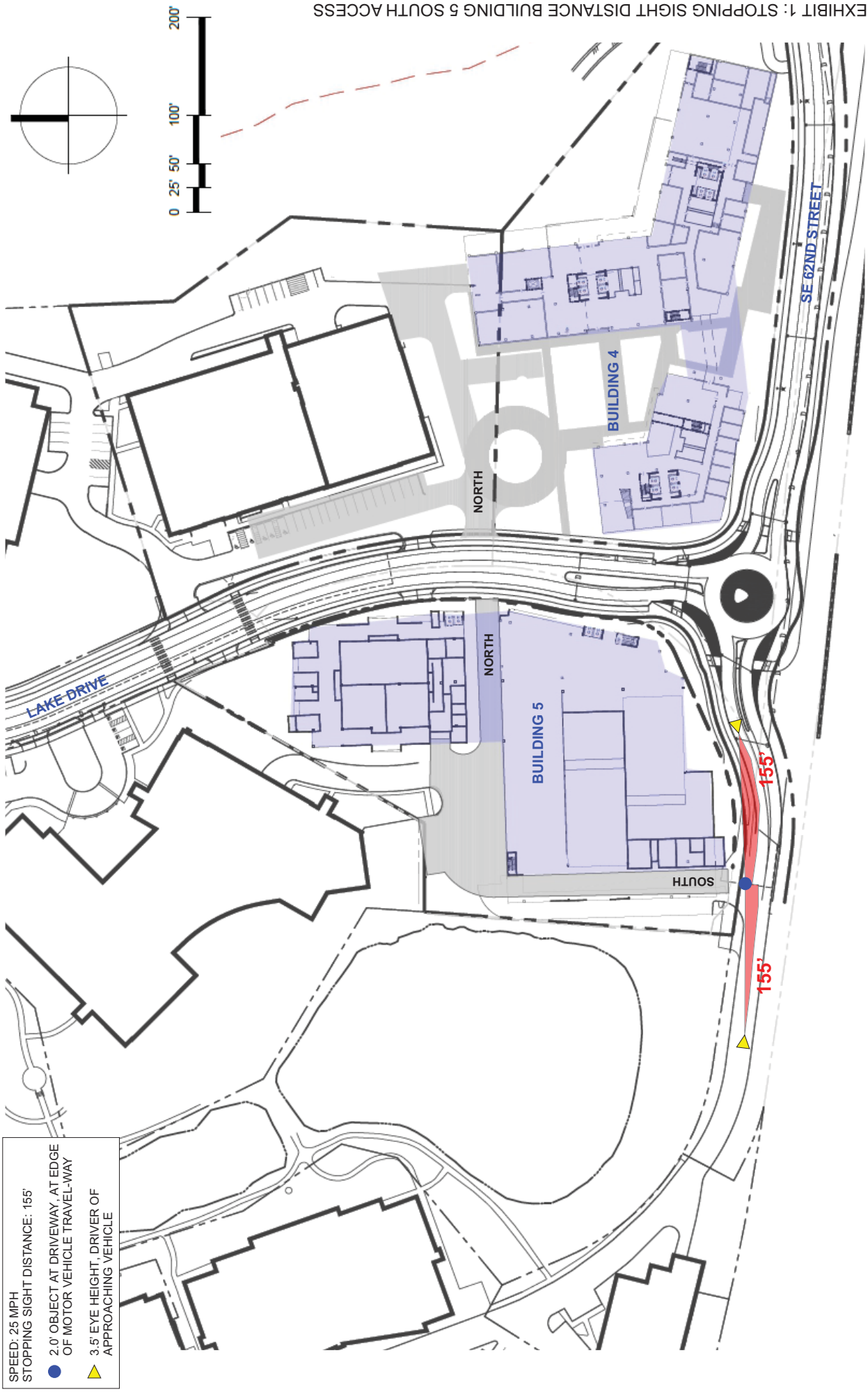
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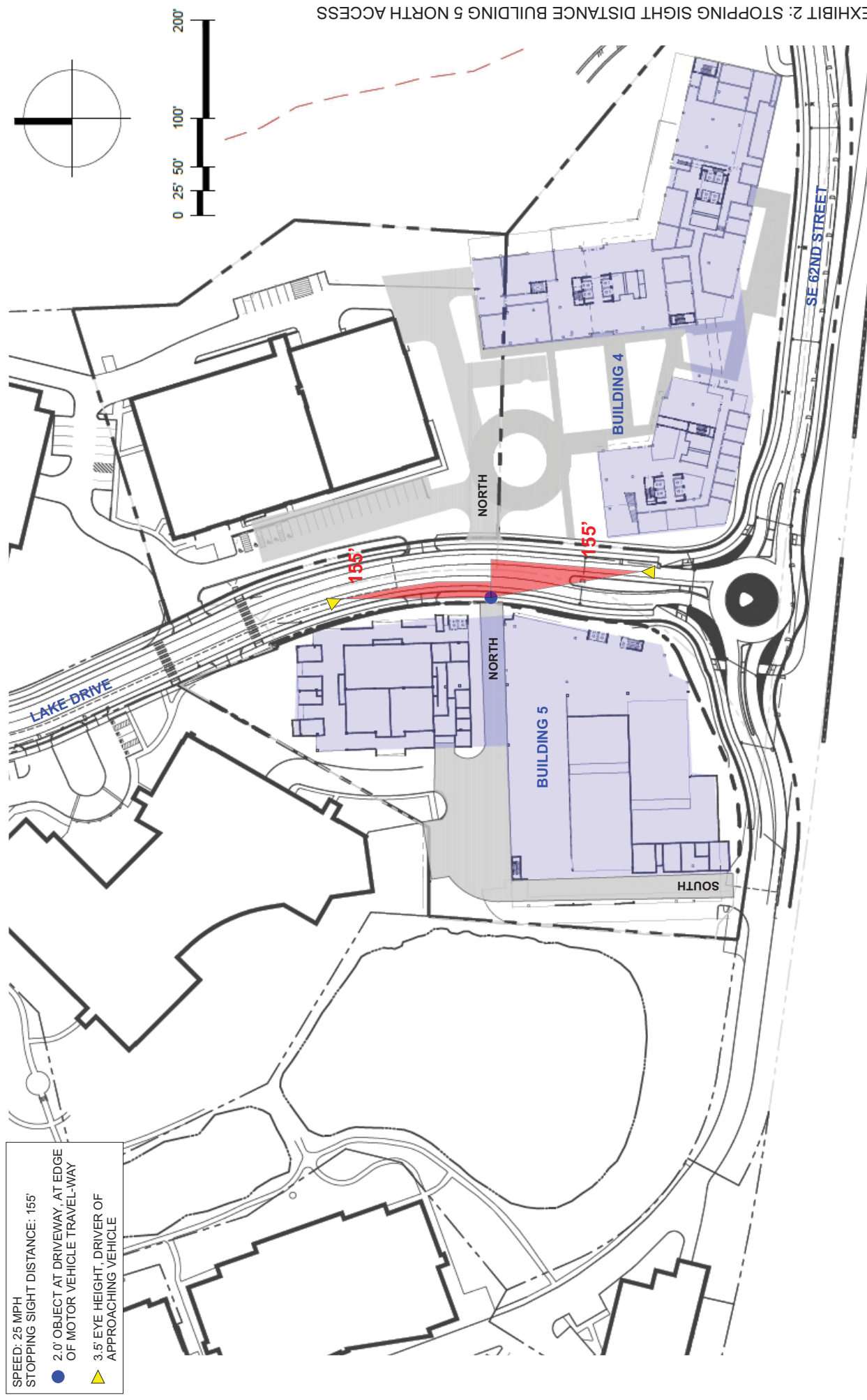


Jeffrey P. K. Hee, PE  
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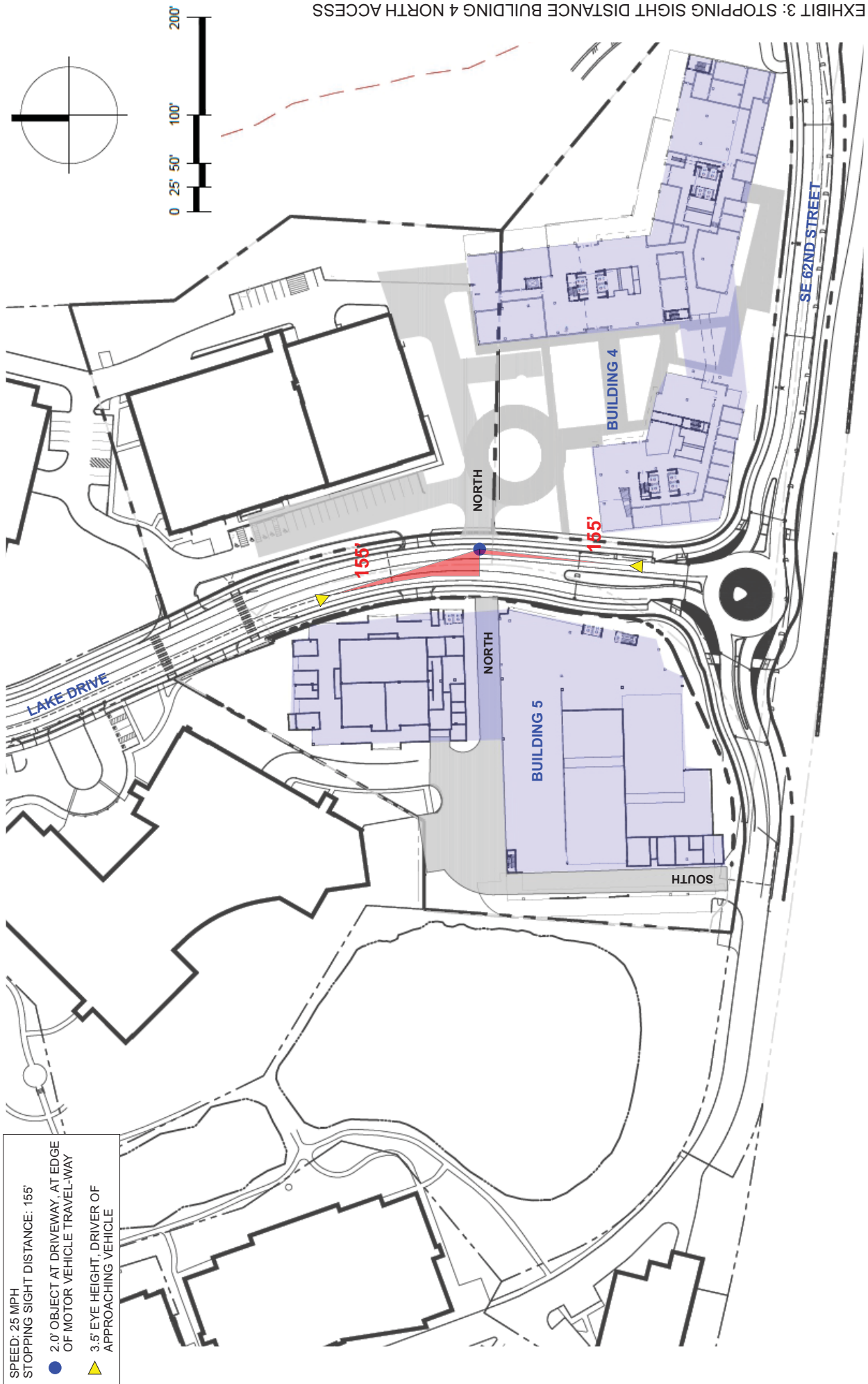
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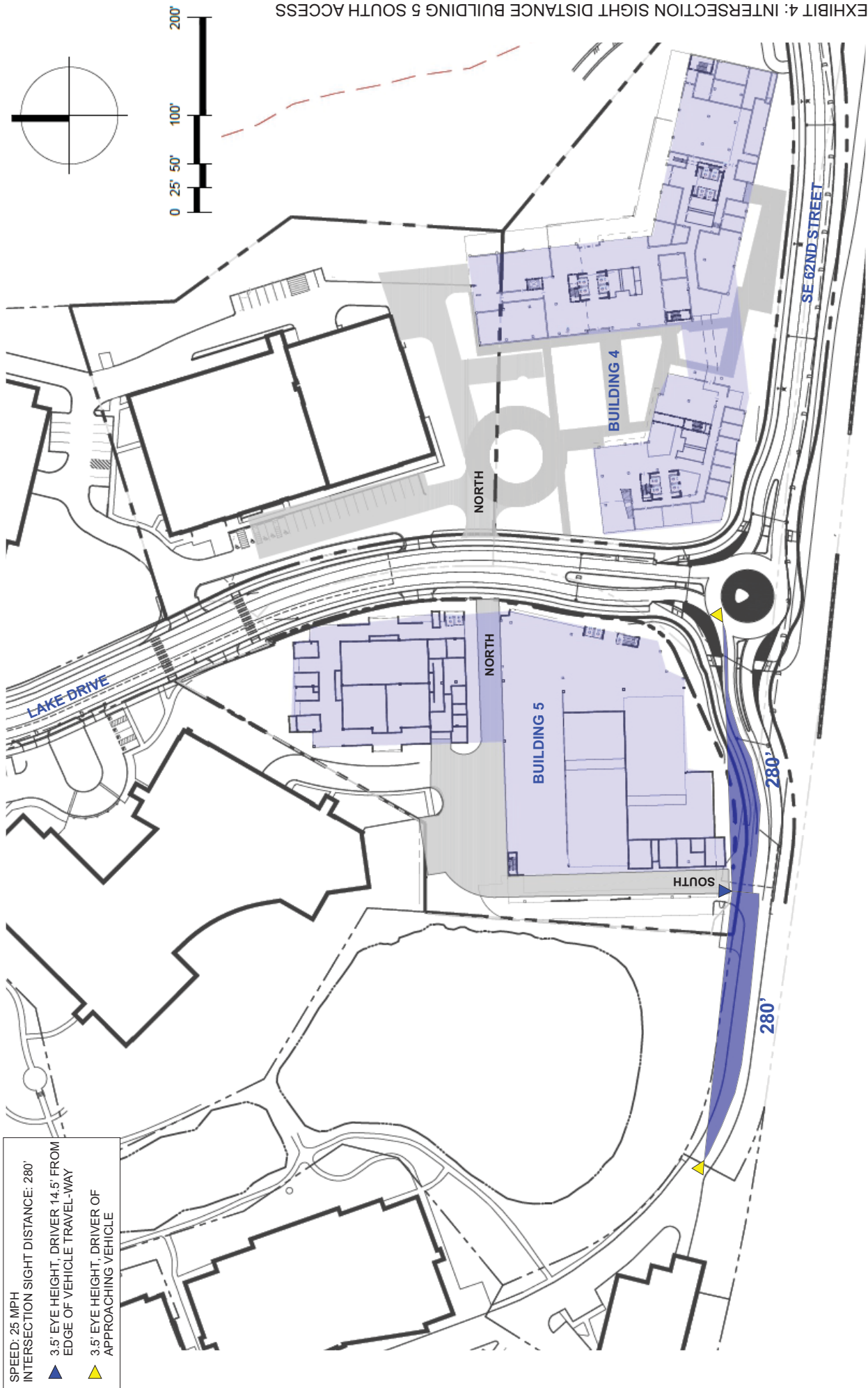


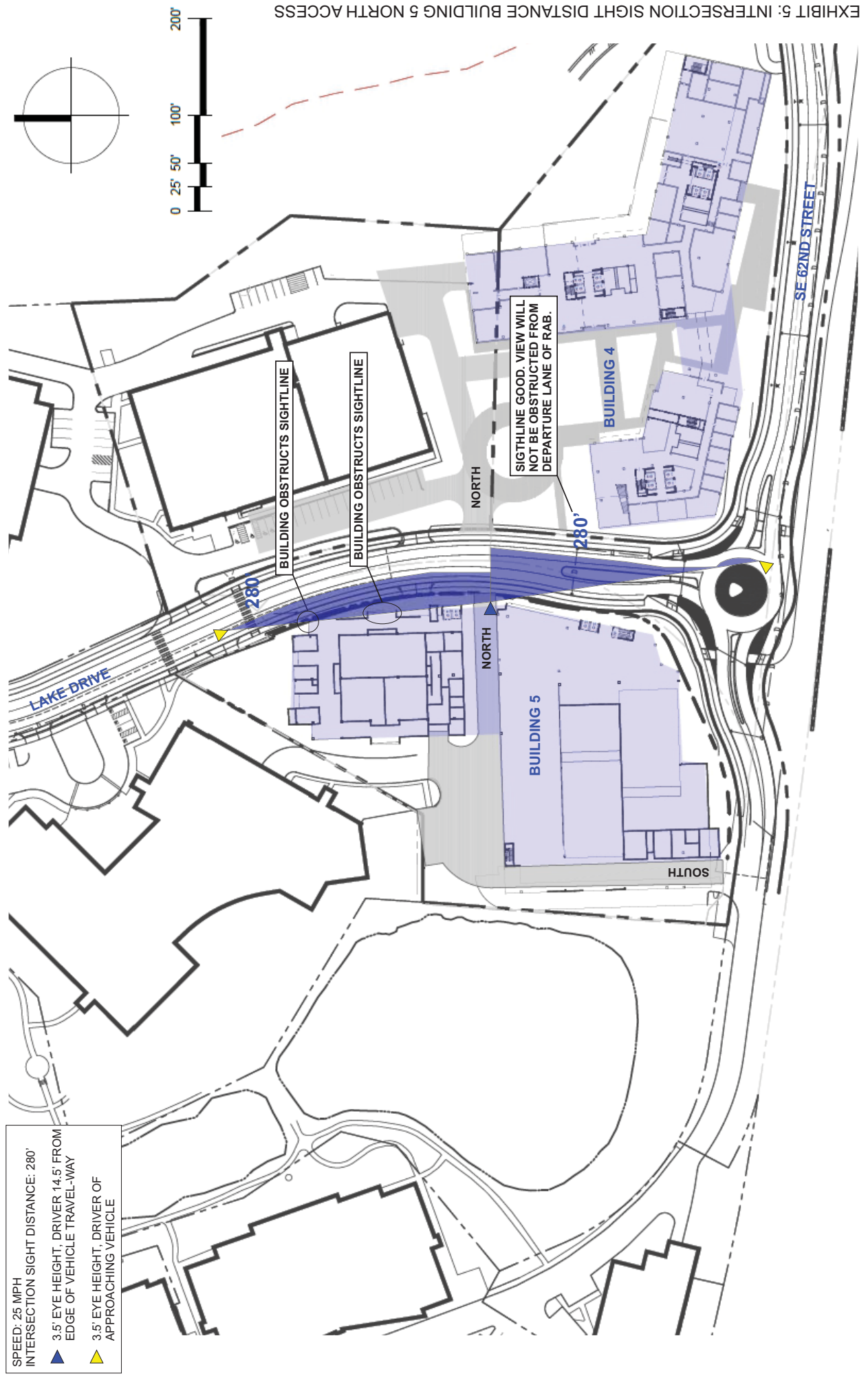


SPEED: 25 MPH  
STOPPING SIGHT DISTANCE: 155'  
● 2.0' OBJECT AT DRIVEWAY, AT EDGE OF MOTOR VEHICLE TRAVEL-WAY  
▲ 3.5' EYE HEIGHT, DRIVER OF APPROACHING VEHICLE







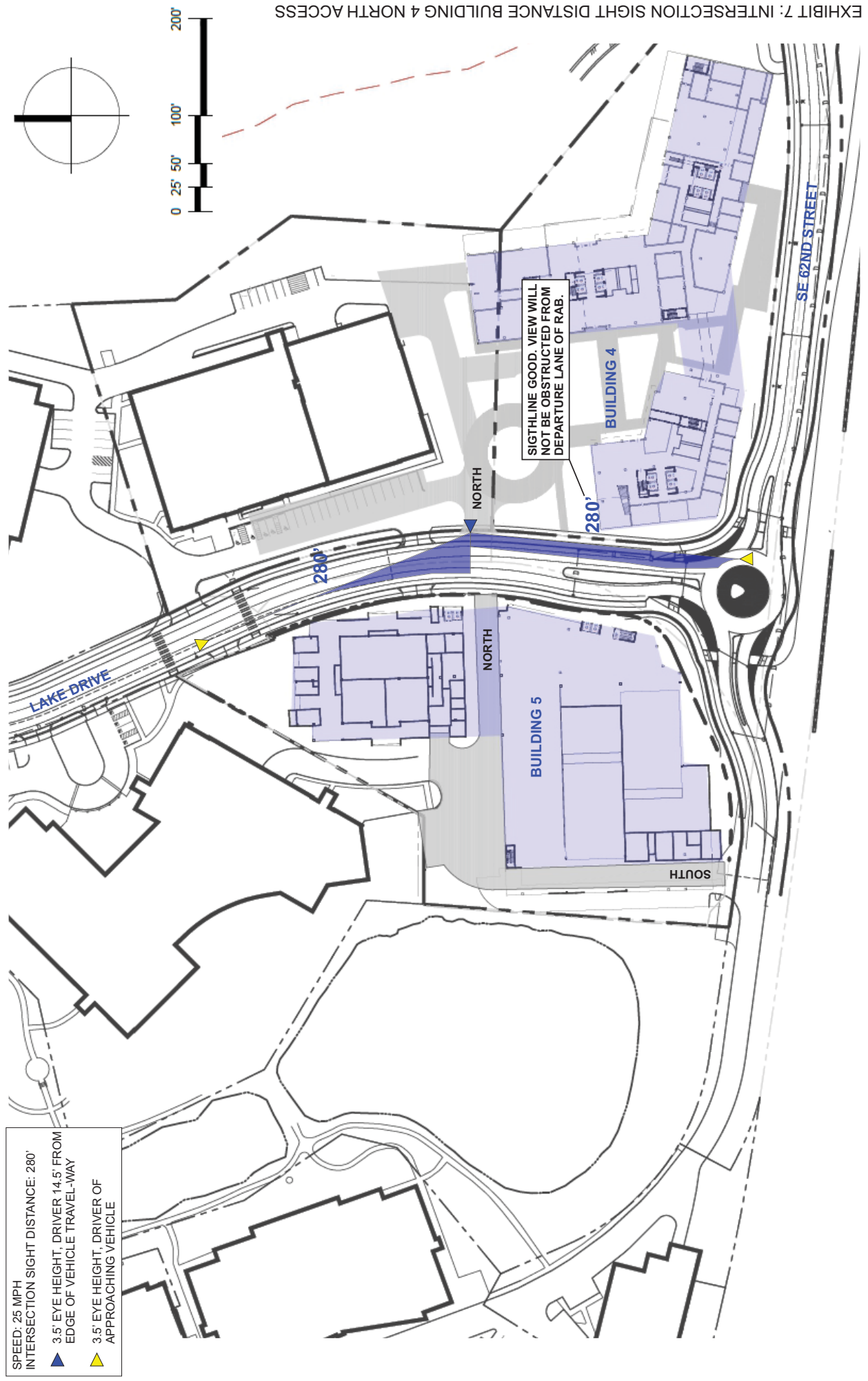


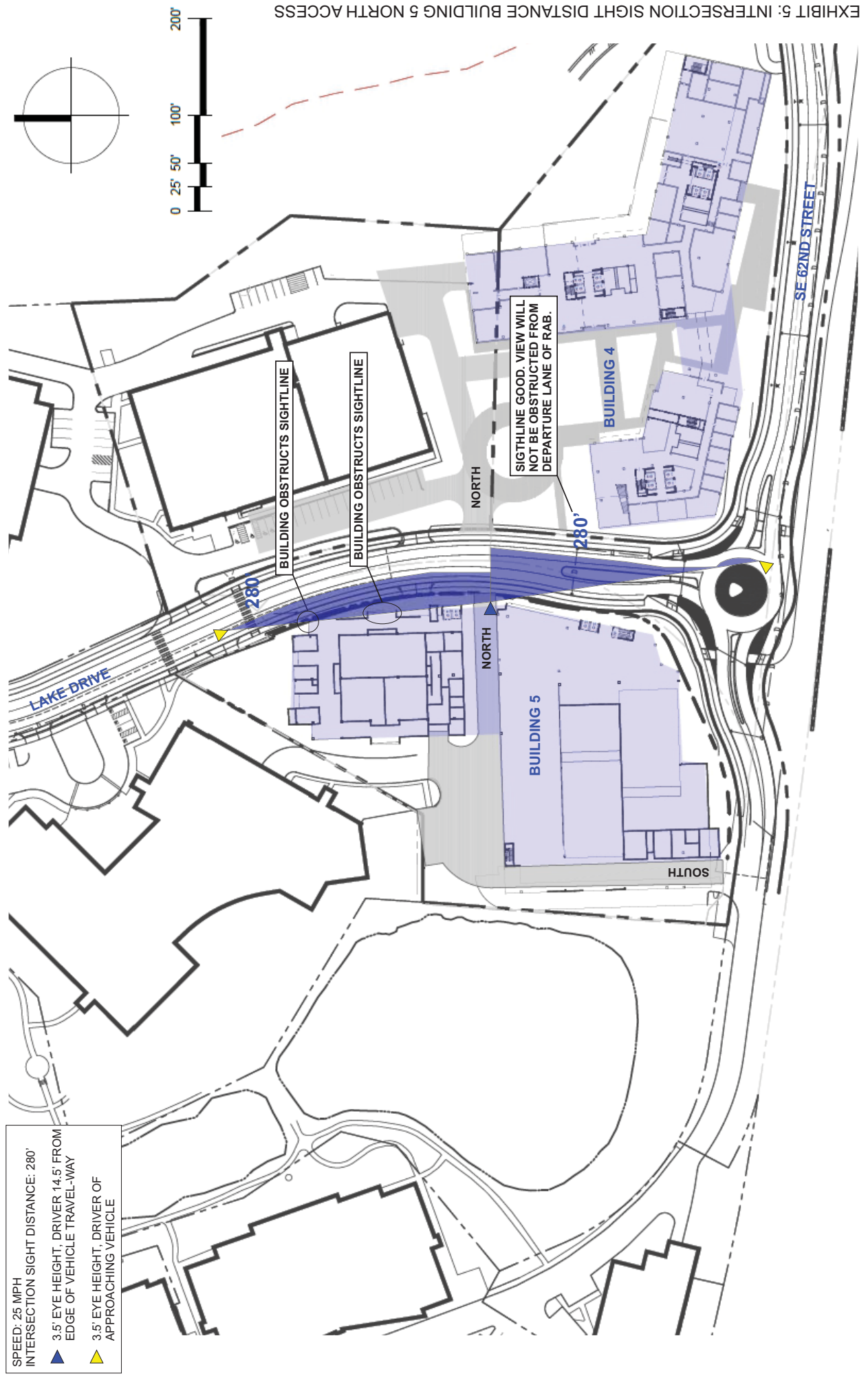


SPEED: 25 MPH  
INTERSECTION SIGHT DISTANCE: 280'  
3.5' EYE HEIGHT, DRIVER 14.5' FROM  
EDGE OF VEHICLE TRAVEL-WAY  
3.5' EYE HEIGHT, DRIVER OF  
APPROACHING VEHICLE



EXHIBIT 6: AVAILABLE INTERSECTION SIGHT DISTANCE BUILDING 5 NORTH ACCESS



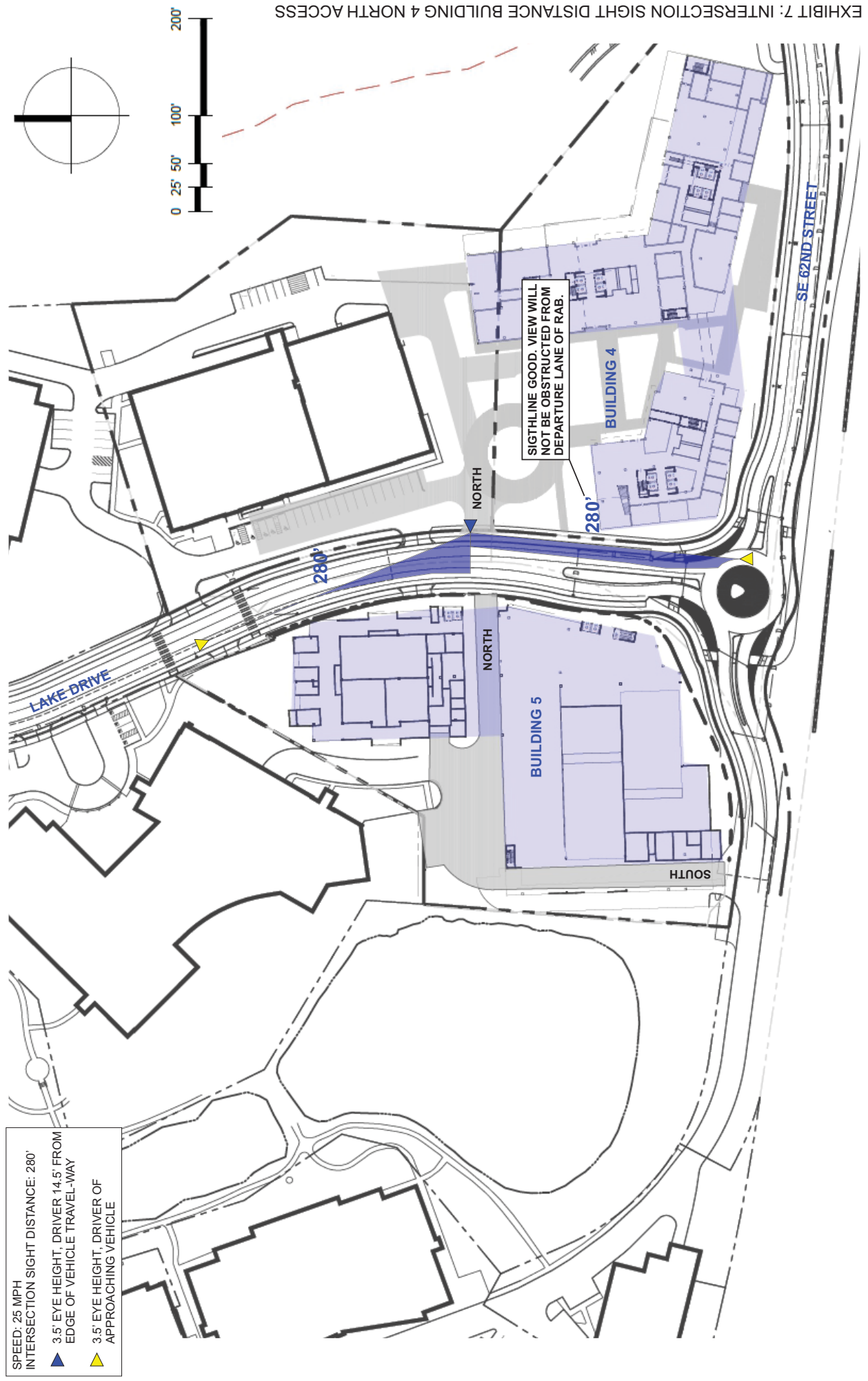




SPEED: 25 MPH  
INTERSECTION SIGHT DISTANCE: 280'  
3.5' EYE HEIGHT, DRIVER 14.5' FROM  
EDGE OF VEHICLE TRAVEL-WAY  
3.5' EYE HEIGHT, DRIVER OF  
APPROACHING VEHICLE



EXHIBIT 6: AVAILABLE INTERSECTION SIGHT DISTANCE BUILDING 5 NORTH ACCESS







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July 17, 2018

To: Steve Bullock, MG2

From: Jeff Hee, TSI

Subject: Costco Home Office  
Revised Traffic Distribution and Lake Drive and 10th Ave NW Signal Timing

This analysis revises the peak hour traffic distribution for the Home Office Traffic Analysis to respond to the following City of Issaquah staff comments, dated July 3, 2018:

*Comment 4. Follow the City's Signal Timing guidelines for Synchro analysis of Lake Drive/10th Ave NW intersection traffic signal improvement scenario. The LOS, Delay, V/C, and queue results should be updated in the report.*

*Comment 5. It is not reasonable to distribute a high number of trips to the Pickering Place shopping area (west of SE 62nd Building driveway, not a through street). Traffic distribution should be revised. The intersection of Lake Drive and 12th Ave NW should also be analyzed for potential impacts. Does Costco have legal access easement rights through all the adjacent private properties?*

*Comment 6. The distribution on SE 62nd St east of the Lake Dr/SE 62nd St roundabout seems too high especially for the AM peak hour period. How was the trip distribution determined for the AM peak period? The SB left-turn volumes at the intersection of Lake Dr. and 10th Ave NW should be higher during the AM peak hour period. Also, only 5 NB left-turn trips have been distributed to the Lake Dr./Bldg. 4/5 driveway; there are 333 EB right-turn trips at this driveway during the PM peak period; the volumes are not balanced, and higher number of vehicles are likely to turn left turn Lake Dr onto Bldg. 5 driveway during the AM peak hour. Traffic distribution should be revised.*

It is our understanding that Costco has legal access through the adjacent properties to the west of the home office through the Pickering Place Owners Association. The access-way to the west of Costco is existing and is currently used by Costco employees.

Driveway volumes compiled in the Traffic Analysis (refer to Table 1 and Figures 4 and 5) shows about 7% of AM peak hour the traffic (68 trips in and 7 trips out) and about 8% of PM peak hour the traffic (6 trips in and 71 trips out) west of the site via SE 62nd Street. These ratios were incorporated into the Costco-employee forecast to the west of Home Office campus.

In general, the Citywide Travel Demand (Concurrency) Model used as the basis to forecast trip distribution in the study area. For details see the June 2018 Traffic Study. A copy of the 2030 travel demand model from the City of Issaquah is attached as Figure 1, for reference. For this analysis, the June 2018 Traffic Study trip distribution was revised to shift more Costco-generated traffic onto Lake Drive and away from the Pickering Place shopping center to address staff comments (**Response to Comment 5**).

The Citywide Travel Demand Model only provided information for PM peak hour traffic conditions. The revised AM peak hour traffic distribution uses the reverse of the PM peak hour traffic distribution. The distribution

was further refined at campus driveways where there are internal roadways connecting local driveways  
**(Response to Comment 6).**

The signal analysis for the 10th Ave NW and Lake Drive intersection was revised to incorporate signal timing input from the City of Issaquah and the revised traffic distribution **(Response to Comment 4).**

#### **AM Peak Hour Analysis**

- Year 2026 without-development conditions were revised to shift more Costco-generated volumes to the Lake Drive. This assumes higher utilization of the existing Costco driveways along Lake Drive. Proposed changes to the AM peak hour without-development background traffic volumes are highlighted in Figure 2.
- Proposed changes to the AM peak hour traffic distribution are highlighted in Figure 3. The revised trip distribution shifts the majority of Costco traffic to Lake Drive and away from the west Pickering Place shopping area. It is important to understand that there will still be a small percentage of Costco-employees using the internal road network through the shopping area west of the campus to access.
- The resulting proposed changes to the PM peak hour future with-Project traffic volumes are highlighted in Figure 4.

Table 1 summarizes the 2026 without-development and with-development intersection LOS, delay and V/C ratios. With-development conditions also show the 95th-percentile queue forecasts compared with the available lane storage.

Key changes from the June Traffic Analysis with the revised traffic distribution:

- No spillover impacts related to with-development eastbound queues Lake Drive between 11th Ave NW and 10th Ave NW, fronting Costco Warehouse. This is due to fewer eastbound trips on this section of Lake Drive destined to the new Buildings 4 and 5. The forecast also results in lower vehicle impacts at 12th Ave NW and assumes more inbound traffic to the new buildings will be to/from 10th Ave NW.
- With a higher amount of traffic forecast to use Lake Drive, the left turn delays at the new site driveways increase; however, the AM peak hour volume and queue for vehicles exiting the site do not show any significant traffic concerns.
- In the AM peak hour, the 10th/Lake intersection (all-way stop) is forecast to operate at LOS F with full-build out of Buildings 4 and 5 and mitigation is discussed later in this document. The southbound right-turn queue is forecast to block the entrance to Costco gas, but the left turn queue does not extend to the Costco Warehouse driveway on 10th Ave NW.

#### **PM Peak Hour Analysis**

- Unlike the AM peak hour analysis above, the non-development background PM peak hour traffic volume forecast was projected to remain the same.
- Proposed changes to the PM peak hour traffic distribution are highlighted in Figure 5 The revised trip distribution shifts more traffic to Lake Drive and away from the west Pickering Place shopping area.
- The resulting proposed changes to the PM peak hour future with-Project traffic volumes are highlighted in Figure 6.

Table 2 summarizes the 2026 without-development and with-development intersection LOS, delay and V/C ratios. With-development conditions also show the 95th-percentile queue forecasts compared with the available lane storage.

Key changes from the June Traffic Analysis with the revised traffic distribution:

- Delays on Lake Drive exiting the Building 1/Garage; Garage/Trading Building; and Buildings 4 and 5/Trading Building driveways increase by focusing the site trip distribution to Lake Drive. Delays extend to over a minute in the PM peak hour and the V/C ratios are approaching or exceed 1.00 for several exiting maneuvers. Mitigation at 10th/Lake is anticipated to resolve some of these off-street and private (Costco) property impacts by allowing 10th/Lake to be a more attractive route for Costco employees leaving the campus and reduce the potential for traffic cutting through the shopping area west of the campus.
- The roundabout at Lake/62nd is also forecast to operate better in the PM peak hour with the revised trip distribution which shifts more traffic to Lake Drive and toward 10th Ave NW.

### **10th/Lake Mitigation**

A signal and a roundabout were evaluated at 10th/Lake as the mitigation required by Costco under the Development Agreement. Considering the improvement, Costco-generated traffic patterns are likely to shift to the improvement intersection and away from the shopping area west of the campus.

For this analysis, with an improvement at 10th/Lake the AM travel patterns are anticipated to remain the same. Table 3 compares the AM peak hour intersection operations at 10th/Lake.

For this analysis, the PM travel patterns are anticipated to change with more Costco-outbound traffic attracted to the improvement at Lake/10th. Figure 7 shows the proposed PM peak hour with-development traffic volumes with the Lake/10th improvement. Table 4 compares the PM peak hour intersection operations at 10th/Lake and other driveways on Lake Drive affected by

A signal improvement includes extending the eastbound left turn pocket and westbound right turn pocket. A single-lane roundabout improvement includes slip lanes for the westbound right turn movement and southbound right turn movement. A very preliminary exhibit is attached as Figure 8, exhibits with 10% design will be delivered to Issaquah separately.

Review of the findings in the AM and PM peak hour show that a signal operates reasonably well compared to a roundabout and will have a less footprint than the roundabout.

### **Left Turn Pockets**

Left turn pocket modifications are required at:

- At Lake/10th the eastbound left turn storage capacity, with a signal improvement, will need to be extended 100 feet.
- At Lake/10th the westbound right turn storage capacity, with a signal improvement, should extend to the parking driveway, south of the intersection on Lake Drive.
- On Lake Drive between the Building 3 driveway and the Garage/Trading Building driveway a center two-way left turn lane is recommended to support lefts turns into the driveways. This is consistent with the June 2018 Traffic Analysis.

- The northbound left turn storage on Lake Drive at the Buildings 4 and 5/Trading Building driveway is recommended to be at least 100 feet to support AM peak hour 95th-percentile queues.
- The southbound left turn storage on Lake Drive at the Buildings 4 and 5/Trading Building driveway is recommended to be at least 60 feet to support AM peak hour 95th-percentile queues.

### **Road Impacts**

AM peak hour impacts to the shopping area west of the Costco Home Office campus are limited to Costco-employee traffic using this route as an alternative to Lake Drive. Currently about 7% of the AM peak hour the traffic to the campus use this route. With the new buildings a similar percentage of Costco traffic is forecast to continue to use this route.

The shopping area consists primarily of shopping-related businesses which have peak demands around noon, on a typical weekday per ITE. In the AM peak hour shopping-related traffic is light and some of the retail businesses are closed. Morning impacts from Costco-employees are not anticipated to adversely impede morning traffic flow in the shopping area west of the campus.

Currently about 8% of the PM peak hour the traffic to the campus use this route. With the new buildings a smaller percentage of Costco traffic (6%) is forecast to continue to use this route to and from the shopping area west of the campus.

New PM peak hour impacts to the shopping area are reasonably proportional to the current PM peak hour impacts to the shopping area.

Similar, to the June Traffic Analysis report, with the revised trip distribution, there are no instances where queues are projected to spillback between intersections and driveways on public or private streets.

### **Future Traffic Considerations**

This analysis assumes that the traffic volume diversion associated with the SE 62nd Street road improvements occur as forecasted and that Pickering Place uses redevelop per the Citywide Travel Demand model.

It is important to note that this analysis does not incorporate:

- Increases in the non-auto mode split, per the City of Issaquah's Comprehensive Plan.
- Increase in average vehicle occupancy.
- Changes in the annual percent background traffic growth.
- Reductions in traffic growth due to peak period spreading (specifically in the PM peak hour) due to regional capacity constraints.
- An expansion or changes to Costco's Commute Trip Reduction strategies, as required by the State of Washington and as implemented to support the travel experiences Costco-employees.
- Future completion of an overcrossing of I-90 from Pickering Place.

With these considerations, this analysis is conservative and represents a worst-case condition.

I trust that this analysis effectively responds to both City of Issaquah comments.

**Table 1: 2026 Without and With-Development AM Peak Hour Traffic Analysis – No Mitigation**

Intersection	Mvmt.	Without-Development			With-Development				
		LOS	Delay	V/C	LOS	Delay	V/C	95-Q (ft)	Storage (ft)
1. Lake Dr. at 11th Ave (All Stop)	SB LT	B	13.3	0.45	E	38.6	0.87	200	315
	SB TR	A	8.4	0.06	A	9.7	0.14	98	315
	Avg.	B	11.1		C	24.8			
2. Lake Dr. at West Drwy. (N/S Stop)	EB L	A	7.5	0.00	A	7.6	0.00	6	160
	EB TR							3	290
	WB L	A	8.2	0.02	A	8.9	0.02	32	70
	WB TR							47	175
	NB	B	12.7	0.06	C	16.9	0.09	12	
	SB	B	11.4	0.01	B	13.9	0.01		
3. Lake Dr. at Bldg. 2 Drwy. (N/S Stop)	EB L	A	7.6	0.00	A	7.7	0.00	3	70
	EB TR							28	175
	WB L	A	8.0	0.04	A	8.8	0.05	41	50
	WB TR							13	170
	NB	A	9.8	0.02	B	11.7	0.03	36	
	SB	B	12.0	0.03	C	15.2	0.04	29	
4. Lake at 10th Ave (All Stop)	EB L	A	9.7	0.11	B	11.7	0.14	112	50
	EB T	B	11.2	0.33	E	42.3	0.95	250	280
	WB T	A	8.8	0.02	B	11.7	0.09	49	200
	WB R	A	8.4	0.07	B	11.4	0.14	49	50
	SB L	B	14.4	0.50	F	162	1.25	281	330
	SB R	A	8.0	0.11	A	9.4	0.13	322	250
	Avg.	B	11.8		F	93.1			
5. Lake Dr. at Bldg. 1/Garage Drwy. (E/W Stop)	EB	C	23.3	0.06	F	60.2	0.17	31	
	WB	C	16.8	0.01	E	36.6	0.02	15	
	NB L	A	7.8	0.01	A	9.8	0.02	31	50
	NB TR							9	350
	SB L	A	8.2	0.20	A	8.4	0.21	54	75
	SB TR								200
6. Lake Dr. at Bldg. 3 (EB Stop)	EB	B	11.4	0.07	C	22.2	0.18	61	
	NB L	A	7.8	0.01	A	9.6	0.01	18	50
	NB T							0	90
	SB							9	350
7. Lake Dr. at Bldg. 5/Garage/ Trading Drwy. (E/W Stop)	WB	B	10.1	0.01	C	23.3	0.10	41	
	NB							13	200
	SB L	A	7.9	0.09	A	8.9	0.24	67	50
	SB TR							32	90
8. Lake Dr. at Bldgs. 4 & 5/ Trading Drwy. (E/W Stop)	EB	B	10.7	0.08	F	78.2	0.70	70	
	WB	B	10.5	0.01	E	42.4	0.34	53	
	NB L	A	7.6	0.05	A	9.6	0.36	97	50
	NB TR							96	250
	SB L	A	7.6	0.01	A	8.6	0.15	54	50
	SB TR							34	200
9. Lake Dr at SE 62nd Street (RAB)?	EB	A	4.7	0.01	A	4.1	0.04	5	260
	WB	A	3.8	0.27	A	4.5	0.95	1,000+	2,000
	SB	A	4.7	0.07	A	9.2	0.15	21	250
10. SE 62nd Street at Bldg. 5 Drwy. (SB Stop)	EB	A	7.8	0.06	B	10.1	0.19	107	300
	WB							47	260
	SB	A	9.4	0.03	C	16.9	0.26	82	

**Table 2 2026 With-Development PM Peak Hour Traffic Analysis – No Mitigation**

Intersection	Mvmt.	LOS	Delay	V/C	95-Q (ft)	Storage (ft)
1. Lake Dr. at 11th Ave (All Stop)	WB LT	E	40.7	0.85	209	290
	WB R	E	48.7	0.92	139	110
	Avg.	D	33.0			
2. Lake Dr. at West Drwy. (N/S Stop)	EB L	A	9.5	0.40	36	160
	EB TR				1	290
	WB L	A	7.8	0.03	27	70
	WB TR				31	175
	NB	E	47.4	0.47	75	
	SB	D	29.5	0.44	95	
3. Lake Dr. at Bldg. 2 Drwy. (N/S Stop)	EB L	A	9.4	0.04	37	70
	EB TR				13	175
	WB L	A	7.7	0.03	26	50
	WB TR				37	170
	NB	B	10.1	0.15	65	
	SB	D	27.4	0.46	81	
4. Lake at 10th Ave (All Stop)	EB L	C	18.1	0.55	72	50
	EB T	B	11.6	0.26	46	280
	WB T	D	33.1	0.85	158	200
	WB R	D	26.3	0.81	112	50
	SB L	B	11.9	0.11	43	330
	SB R	B	12.2	0.27	62	250
	Avg.	C	24.3			
5. Lake Dr. at Bldg. 1/Garage Drwy. (E/W Stop)	EB	F	87.5	0.68	91	
	WB	E	49.9	0.76	121	
	NB L	A	7.6	0.02	20	50
	NB TR				20	350
	SB L	A	9.6	0.01	13	75
	SB TR				0	200
6. Lake Dr. at Bldg. 3 (EB Stop)	EB	C	19.5	0.15	52	
	NB L	A	7.7	0.01	14	50
	NB T				0	90
	SB				0	350
7. Lake Dr. at Bldg. 5/Garage/ Trading Drwy. (E/W Stop)	WB	F	140	1.20	168	
	NB				6	200
	SB L	A	8.8	0.03	35	50
	SB TR				0	90
8. Lake Dr. at Bldgs. 4 & 5/ Trading Drwy. (E/W Stop)	EB	F	264	1.49	128	
	WB	F	84.4	0.97	106	
	NB L	A	8.2	0.06	45	50
	NB TR				0	250
	SB L	A	7.8	0.03	26	50
	SB TR				0	200
9. Lake Dr at SE 62nd Street (RAB) - CHECK	EB	A	7.5	0.15	20	260
	WB	A	4.1	0.33	54	2,000
	SB	A	9.0	0.46	78	250
10. SE 62nd Street at Bldg. 5 Drwy. (SB Stop)	EB	A	7.6	0.03	35	300
	WB				2	260
	SB	D	31.0	0.84	138	

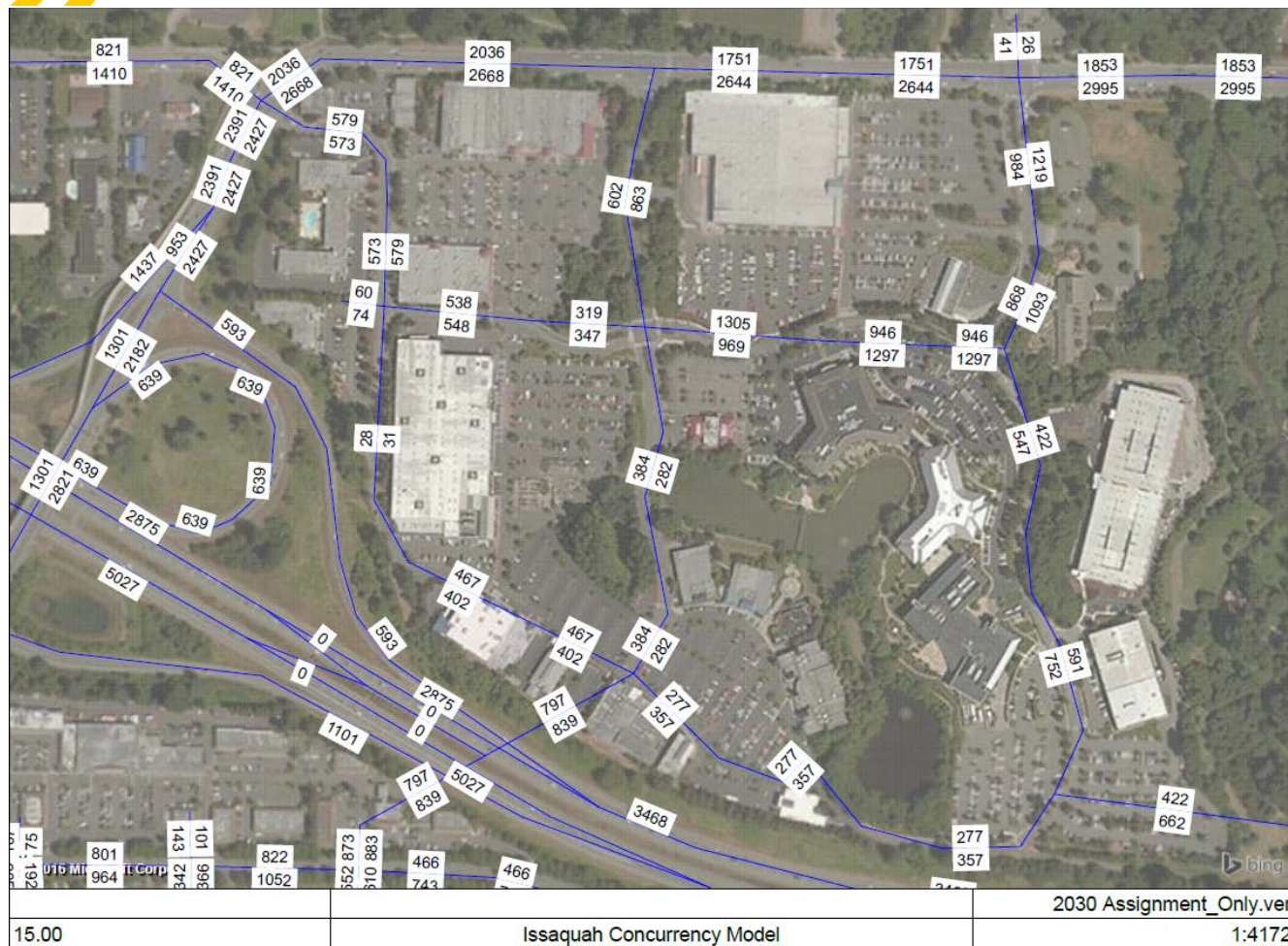
**Table 3: 2026 With-Development AM Peak Hour Traffic Analysis – Lake / 10th Mitigation**

Intersection	Mvmt.	LOS	Delay	V/C	95-Q (ft)	Storage (ft)
4. Lake at 10th Ave (Signal)	EB L	B	11.8	0.13	83	50
	EB T	B	13.5	0.71	186	280
	WB T	B	15.2	0.12	49	200
	WB R	B	15.8	0.24	50	50
	SB L	B	17.5	0.86	268	330
	SB R	A	7.7	0.12	104	250
	Avg.	B	15.1			
4. Lake Dr. at 10th Ave (RAB)	EB	B	12.1	0.61	143	280
	WB	A	4.9	0.04	6	200
	SB	A	8.7	0.42	67	250

**Table 4: 2026 With-Development PM Peak Hour Traffic Analysis – Lake / 10th Mitigation**

Intersection	Mvmt.	LOS	Delay	V/C	95-Q (ft)	Storage (ft)
4. Lake at 10th Ave (All Stop)	EB L	A	8.4	0.59	98	50
	EB T	A	3	0.12	94	280
	WB T	B	10.9	0.65	197	200
	WB R	B	15	0.83	112	50
	SB L	B	18.3	0.2	55	330
	SB R	C	20.1	0.66	68	250
	Avg.	B	12.2			
4. Lake Dr. at 10th Ave (RAB)	EB	A	7.8	0.32	51	280
	WB	A	6.1	0.44	70	200
	SB	A	7.4	0.13	19	250
5. Lake Dr. at Bldg. 1/Garage Drwy. (E/W Stop)	EB	F	187	0.98	68	
	WB	F	65.5	0.92	105	
	NB L	A	7.6	0.02	18	50
	NB TR				29	350
	SB L	A	9.2	0.01	13	75
	SB TR				2	200
6. Lake Dr. at Bldg. 3 (EB Stop)	EB	C	17.4	0.13	58	
	NB L	A	7.7	0.01	18	50
	NB T				0	90
	SB				0	350
7. Lake Dr. at Bldg. 5/Garage/ Trading Drwy. (E/W Stop)	WB	E	44.7	0.85	155	
	NB				3	200
	SB L	A	8.6	0.03	32	50
	SB TR				0	90
8. Lake Dr. at Bldgs. 4 & 5/ Trading Drwy. (E/W Stop)	EB	F	58.2	0.96	129	
	WB	F	21.5	0.86	102	
	NB L	A	8.1	0.06	44	50
	NB TR				0	250
	SB L	A	7.8	0.03	26	50
	SB TR				5	200





**Figure 1: 2030 Citywide Travel Demand Model (PM Peak Hour Trips)**

**Notes:**

- Modeling includes 1,500,000 square feet of building area, with City of Issaquah adjustments for travel modes and trip generation.
- Includes I-90 Overcrossing.
- Includes significant routing of traffic west of Building 5 and south of the lake.



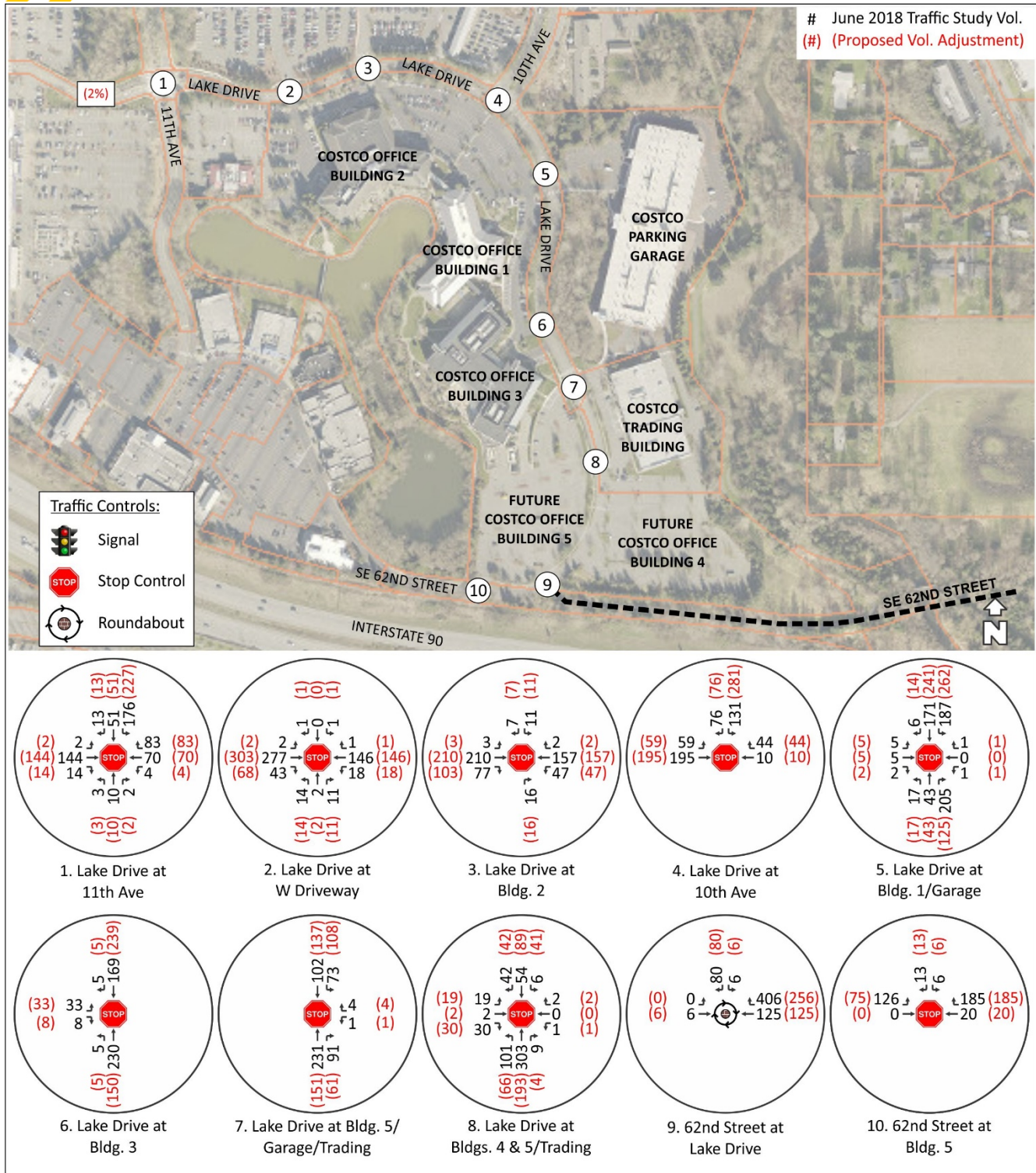
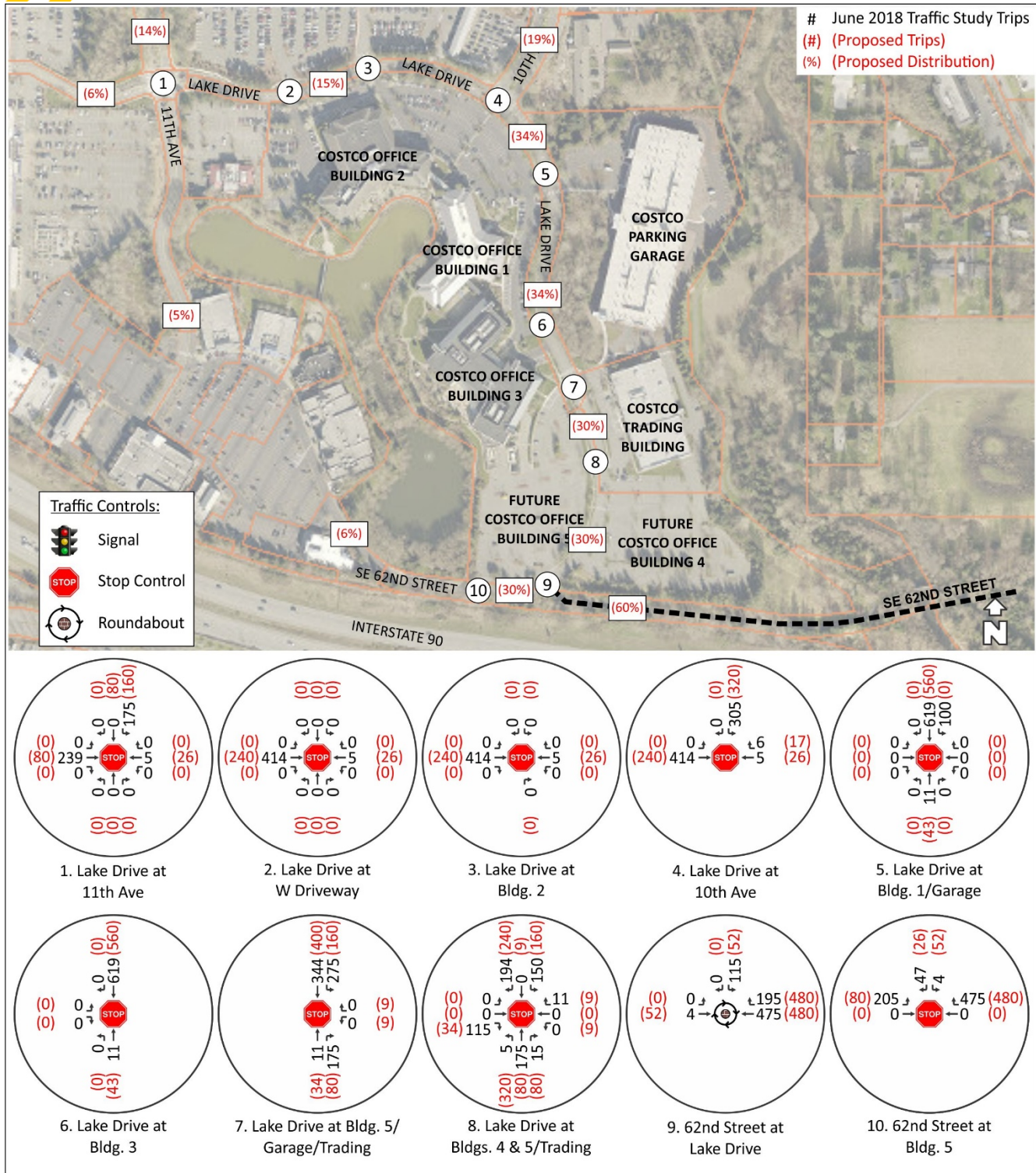
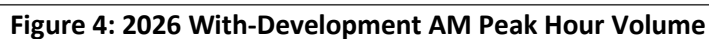


Figure 2: 2026 Without-Development AM Peak Hour Volume















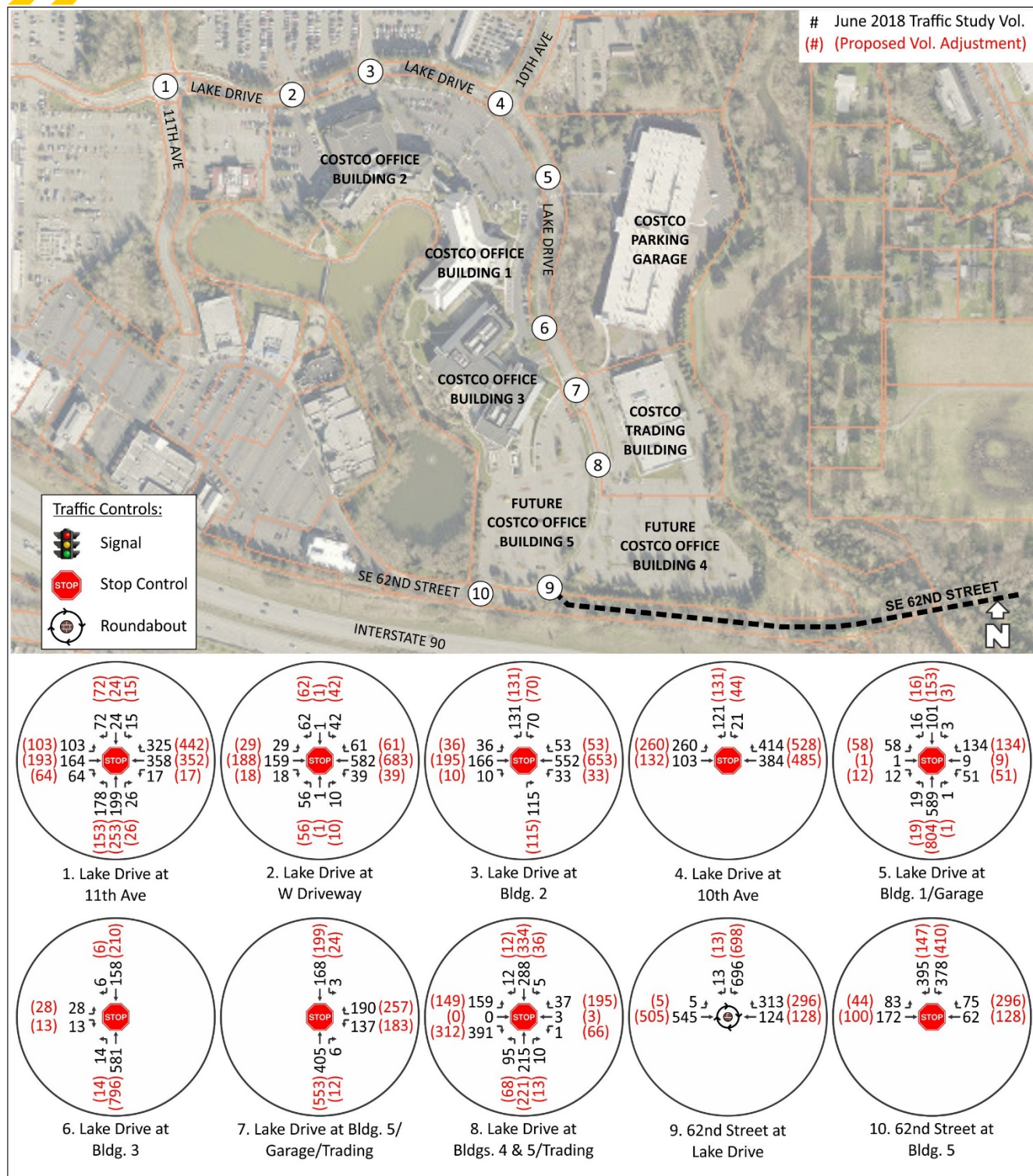
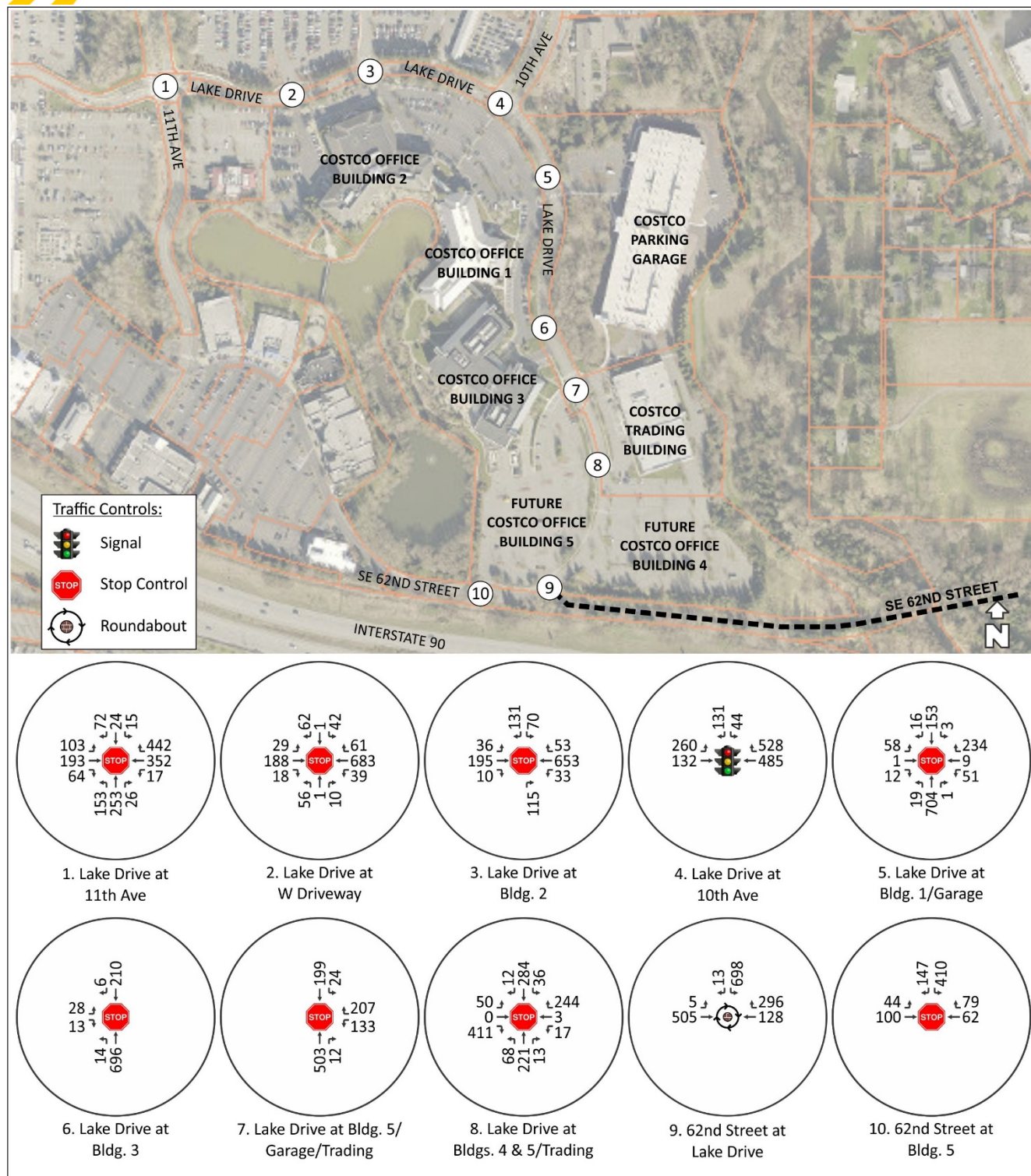


Figure 6: 2026 With-Development PM Peak Hour Volume





**Figure 7: 2026 With-Development PM Peak Hour Volume – Lake/10th Mitigation**



Figure 8: Preliminary Signal and Roundabout Lake Drive and 10th Ave NW

Intersection

Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱		↰↱			↰↱	
Traffic Vol, veh/h	2	144	14	4	70	83	3	10	2	227	51	13
Future Vol, veh/h	2	144	14	4	70	83	3	10	2	227	51	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	2	157	15	4	76	90	3	11	2	247	55	14
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	10.4	8.9	8.7	12.7
HCM LOS	B	A	A	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	38%	0%	100%	0%	5%	0%	90%	0%
Vol Thru, %	62%	71%	0%	91%	95%	0%	10%	66%
Vol Right, %	0%	29%	0%	9%	0%	100%	0%	34%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	7	2	158	74	83	253	39
LT Vol	3	0	2	0	4	0	227	0
Through Vol	5	5	0	144	70	0	26	26
RT Vol	0	2	0	14	0	83	0	13
Lane Flow Rate	9	8	2	172	80	90	274	42
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.015	0.012	0.004	0.267	0.127	0.124	0.445	0.061
Departure Headway (Hd)	6.093	5.752	6.138	5.589	5.679	4.963	5.838	5.233
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	591	626	579	637	627	715	612	678
Service Time	3.793	3.452	3.915	3.366	3.459	2.742	3.622	3.017
HCM Lane V/C Ratio	0.015	0.013	0.003	0.27	0.128	0.126	0.448	0.062
HCM Control Delay	8.9	8.5	8.9	10.4	9.3	8.5	13.3	8.4
HCM Lane LOS	A	A	A	B	A	A	B	A
HCM 95th-tile Q	0	0	0	1.1	0.4	0.4	2.3	0.2









HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	303	68	18	146	1	14	2	11	1	0	1
Future Vol, veh/h	2	303	68	18	146	1	14	2	11	1	0	1
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	2	326	73	19	157	1	15	2	12	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	161	0	0	410	0	0	575	578	373	573	613	161
Stage 1	-	-	-	-	-	-	378	378	-	199	199	-
Stage 2	-	-	-	-	-	-	197	200	-	374	414	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1430	-	-	1160	-	-	432	425	678	433	410	889
Stage 1	-	-	-	-	-	-	648	613	-	807	740	-
Stage 2	-	-	-	-	-	-	809	734	-	651	597	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1430	-	-	1160	-	-	422	413	672	417	398	887
Mov Cap-2 Maneuver	-	-	-	-	-	-	422	413	-	417	398	-
Stage 1	-	-	-	-	-	-	641	607	-	804	726	-
Stage 2	-	-	-	-	-	-	795	720	-	636	591	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	12.7	11.4
HCM LOS			B	B








Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	496	1430	-	-	1160	-	-	567
HCM Lane V/C Ratio	0.059	0.002	-	-	0.017	-	-	0.004
HCM Control Delay (s)	12.7	7.5	-	-	8.2	-	-	11.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0

HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 1.4







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	210	103	47	157	2	0	0	16	11	0	7
Future Vol, veh/h	3	210	103	47	157	2	0	0	16	11	0	7
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	3	221	108	49	165	2	0	0	17	12	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	169	0	0	330	0	0	-	-	276	549	-	194
Stage 1	-	-	-	-	-	-	-	-	-	267	-	-
Stage 2	-	-	-	-	-	-	-	-	-	282	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	1421	-	-	1241	-	-	0	0	768	450	0	853
Stage 1	-	-	-	-	-	-	0	0	-	743	0	-
Stage 2	-	-	-	-	-	-	0	0	-	729	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1390	-	-	1241	-	-	-	-	767	425	-	833
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	425	-	-
Stage 1	-	-	-	-	-	-	-	-	-	740	-	-
Stage 2	-	-	-	-	-	-	-	-	-	711	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.8	9.8	12
HCM LOS			A	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	767	1390	-	-	1241	-	-	425	833
HCM Lane V/C Ratio	0.022	0.002	-	-	0.04	-	-	0.027	0.009
HCM Control Delay (s)	9.8	7.6	-	-	8	-	-	13.7	9.4
HCM Lane LOS	A	A	-	-	A	-	-	B	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1	0

Intersection	
Intersection Delay, s/veh	11.8
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	195	10	44	281	76
Future Vol, veh/h	59	195	10	44	281	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	64	212	11	48	305	83
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	10.9	8.5	13
HCM LOS	B	A	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	59	195	10	44	281	76
LT Vol	59	0	0	0	281	0
Through Vol	0	195	10	0	0	0
RT Vol	0	0	0	44	0	76
Lane Flow Rate	64	212	11	48	305	83
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.109	0.332	0.018	0.069	0.498	0.107
Departure Headway (Hd)	6.145	5.64	5.931	5.221	5.873	4.669
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	580	634	598	678	611	761
Service Time	3.915	3.409	3.726	3.016	3.644	2.439
HCM Lane V/C Ratio	0.11	0.334	0.018	0.071	0.499	0.109
HCM Control Delay	9.7	11.2	8.8	8.4	14.4	8
HCM Lane LOS	A	B	A	A	B	A
HCM 95th-tile Q	0.4	1.5	0.1	0.2	2.8	0.4

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5

Timing Plan: AM

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	5	5	2	1	0	1	17	43	125	262	241	14
Future Vol, veh/h	5	5	2	1	0	1	17	43	125	262	241	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	5	2	1	0	1	18	47	136	285	262	15

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	991	1059	270	995	999	115	277	0	0	183	0	0
Stage 1	839	839	-	152	152	-	-	-	-	-	-	-
Stage 2	152	220	-	843	847	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	227	226	774	226	245	943	1298	-	-	1404	-	-
Stage 1	363	384	-	855	775	-	-	-	-	-	-	-
Stage 2	855	725	-	361	381	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	189	178	774	184	193	943	1298	-	-	1404	-	-
Mov Cap-2 Maneuver	189	178	-	184	193	-	-	-	-	-	-	-
Stage 1	358	306	-	843	764	-	-	-	-	-	-	-
Stage 2	842	715	-	282	304	-	-	-	-	-	-	-

Approach	EB		WB		NB			SB				
HCM Control Delay, s	23.3		16.8		0.7			4.2				
HCM LOS	C		C									






Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1298	-	-	210 308	1404	-	-
HCM Lane V/C Ratio	0.014	-	-	0.062 0.007	0.203	-	-
HCM Control Delay (s)	7.8	-	-	23.3 16.8	8.2	-	-
HCM Lane LOS	A	-	-	C C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2 0	0.8	-	-

HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	8	5	150	239	5
Future Vol, veh/h	33	8	5	150	239	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	36	9	5	163	260	5





Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	437	263	265
Stage 1	263	-	-
Stage 2	174	-	-
Critical Hdwy	6.4	6.2	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	2.2
Pot Cap-1 Maneuver	581	781	1311
Stage 1	786	-	-
Stage 2	861	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	579	781	1311
Mov Cap-2 Maneuver	579	-	-
Stage 1	786	-	-
Stage 2	858	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.4	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1311	-	610	-	-
HCM Lane V/C Ratio	0.004	-	0.073	-	-
HCM Control Delay (s)	7.8	-	11.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

HCM 2010 TWSC  
7: Lake Drive & Garage/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection						
Int Delay, s/veh	2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	4	151	61	108	137
Future Vol, veh/h	1	4	151	61	108	137
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	1	4	164	66	117	149
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	581	197	0	0	230	0
Stage 1	197	-	-	-	-	-
Stage 2	384	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	479	849	-	-	1350	-
Stage 1	841	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	437	849	-	-	1350	-
Mov Cap-2 Maneuver	437	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	633	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	10.1	0	3.5			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	714	1350	-	
HCM Lane V/C Ratio	-	-	0.008	0.087	-	
HCM Control Delay (s)	-	-	10.1	7.9	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0	0.3	-	

HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Costco Buildings 4 and 5

Timing Plan: AM

Intersection												
Int Delay, s/veh	2.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	19	2	30	1	0	2	66	193	4	6	54	77
Future Vol, veh/h	19	2	30	1	0	2	66	193	4	6	54	77
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	21	2	33	1	0	2	72	210	4	7	59	84

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	471	472	101	486	510	212	142	0	0	214	0	0
Stage 1	114	114	-	355	355	-	-	-	-	-	-	-
Stage 2	357	358	-	131	155	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	506	493	960	495	469	833	1453	-	-	1368	-	-
Stage 1	896	805	-	666	633	-	-	-	-	-	-	-
Stage 2	665	631	-	877	773	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	484	466	960	457	443	833	1453	-	-	1368	-	-
Mov Cap-2 Maneuver	484	466	-	457	443	-	-	-	-	-	-	-
Stage 1	852	801	-	633	602	-	-	-	-	-	-	-
Stage 2	630	600	-	841	769	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	10.7		10.5		1.9		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1453	-	-	682 654	1368	-	-
HCM Lane V/C Ratio	0.049	-	-	0.081 0.005	0.005	-	-
HCM Control Delay (s)	7.6	-	-	10.7 10.5	7.6	-	-
HCM Lane LOS	A	-	-	B B	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	0.3 0	0	-	-

# MOVEMENT SUMMARY

 **Site: [9. 62nd & Lake - 2026 AM No Build]**

Costco Buildings 4 and 5  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: SE 62nd St												
6	T1	130	1.0	0.272	3.8	LOS A	1.4	34.7	0.02	0.43	0.02	38.2
16	R2	267	1.0	0.272	3.9	LOS A	1.4	34.7	0.02	0.43	0.02	36.9
Approach		397	1.0	0.272	3.8	LOS A	1.4	34.7	0.02	0.43	0.02	37.3
North: Lake Dr												
7	L2	6	1.0	0.067	10.2	LOS B	0.3	7.0	0.24	0.48	0.24	37.4
14	R2	83	1.0	0.067	4.3	LOS A	0.3	7.0	0.24	0.48	0.24	36.1
Approach		90	1.0	0.067	4.7	LOS A	0.3	7.0	0.24	0.48	0.24	36.2
West: Lake Dr												
5	L2	1	1.0	0.005	9.8	LOS A	0.0	0.5	0.04	0.42	0.04	37.7
2	T1	6	1.0	0.005	3.8	LOS A	0.0	0.5	0.04	0.42	0.04	37.6
Approach		7	1.0	0.005	4.7	LOS A	0.0	0.5	0.04	0.42	0.04	37.6
All Vehicles		494	1.0	0.272	4.0	LOS A	1.4	34.7	0.06	0.44	0.06	37.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Intersection

Int Delay, s/veh 2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	75	0	20	185	6	13
Future Vol, veh/h	75	0	20	185	6	13
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	82	0	22	201	7	14

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	223	0	0 285 122
Stage 1	-	-	- 122 -
Stage 2	-	-	- 163 -
Critical Hdwy	4.1	-	- 6.4 6.2
Critical Hdwy Stg 1	-	-	- 5.4 -
Critical Hdwy Stg 2	-	-	- 5.4 -
Follow-up Hdwy	2.2	-	- 3.5 3.3
Pot Cap-1 Maneuver	1358	-	- 710 935
Stage 1	-	-	- 908 -
Stage 2	-	-	- 871 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	1358	-	- 667 935
Mov Cap-2 Maneuver	-	-	- 667 -
Stage 1	-	-	- 908 -
Stage 2	-	-	- 819 -

Approach	EB	WB	SB
HCM Control Delay, s	7.8	0	9.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1358	-	-	-	830
HCM Lane V/C Ratio	0.06	-	-	-	0.025
HCM Control Delay (s)	7.8	0	-	-	9.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1

Intersection

Intersection Delay, s/veh	24.8
Intersection LOS	C







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱		↰↱			↰↱	
Traffic Vol, veh/h	2	224	14	4	95	83	3	10	2	387	131	13
Future Vol, veh/h	2	224	14	4	95	83	3	10	2	387	131	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	2	243	15	4	103	90	3	11	2	421	142	14
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	15.5	10.8	9.9	34.3
HCM LOS	C	B	A	D

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	38%	0%	100%	0%	4%	0%	86%	0%
Vol Thru, %	62%	71%	0%	94%	96%	0%	14%	83%
Vol Right, %	0%	29%	0%	6%	0%	100%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	8	7	2	238	99	83	453	79
LT Vol	3	0	2	0	4	0	387	0
Through Vol	5	5	0	224	95	0	66	66
RT Vol	0	2	0	14	0	83	0	13
Lane Flow Rate	9	8	2	259	108	90	492	85
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.017	0.014	0.004	0.479	0.205	0.154	0.874	0.141
Departure Headway (Hd)	7.177	6.832	7.195	6.663	6.868	6.152	6.399	5.936
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	495	520	496	538	521	580	566	603
Service Time	4.967	4.622	4.961	4.428	4.64	3.923	4.144	3.681
HCM Lane V/C Ratio	0.018	0.015	0.004	0.481	0.207	0.155	0.869	0.141
HCM Control Delay	10.1	9.7	10	15.5	11.4	10.1	38.6	9.7
HCM Lane LOS	B	A	A	C	B	B	E	A
HCM 95th-tile Q	0.1	0	0	2.6	0.8	0.5	9.8	0.5

HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection												
Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	543	68	18	171	1	14	2	11	1	0	1
Future Vol, veh/h	2	543	68	18	171	1	14	2	11	1	0	1
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	2	584	73	19	184	1	15	2	12	1	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	188	0	0	668	0	0	860	863	631	858	898	187
Stage 1	-	-	-	-	-	-	636	636	-	226	226	-
Stage 2	-	-	-	-	-	-	224	227	-	632	672	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1398	-	-	931	-	-	278	291	485	279	281	860
Stage 1	-	-	-	-	-	-	469	470	-	781	721	-
Stage 2	-	-	-	-	-	-	783	714	-	472	458	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1398	-	-	931	-	-	271	281	481	265	272	858
Mov Cap-2 Maneuver	-	-	-	-	-	-	271	281	-	265	272	-
Stage 1	-	-	-	-	-	-	464	465	-	778	705	-
Stage 2	-	-	-	-	-	-	766	698	-	458	453	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.8	16.9	13.9
HCM LOS			C	B








Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	331	1398	-	-	931	-	-	405
HCM Lane V/C Ratio	0.088	0.002	-	-	0.021	-	-	0.005
HCM Control Delay (s)	16.9	7.6	-	-	8.9	-	-	13.9
HCM Lane LOS	C	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0.1	-	-	0

HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection

Int Delay, s/veh 1.1







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	450	103	47	182	2	0	0	16	11	0	7
Future Vol, veh/h	3	450	103	47	182	2	0	0	16	11	0	7
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	3	474	108	49	192	2	0	0	17	12	0	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	196	0	0	583	0	0	-	-	529	828	-	221
Stage 1	-	-	-	-	-	-	-	-	-	294	-	-
Stage 2	-	-	-	-	-	-	-	-	-	534	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	1389	-	-	1001	-	-	0	0	554	293	0	824
Stage 1	-	-	-	-	-	-	0	0	-	719	0	-
Stage 2	-	-	-	-	-	-	0	0	-	534	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1359	-	-	1001	-	-	-	-	554	273	-	805
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	273	-	-
Stage 1	-	-	-	-	-	-	-	-	-	716	-	-
Stage 2	-	-	-	-	-	-	-	-	-	517	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1.8	11.7	15.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	554	1359	-	-	1001	-	-	273	805
HCM Lane V/C Ratio	0.03	0.002	-	-	0.049	-	-	0.042	0.009
HCM Control Delay (s)	11.7	7.7	-	-	8.8	-	-	18.8	9.5
HCM Lane LOS	B	A	-	-	A	-	-	C	A
HCM 95th %tile Q(veh)	0.1	0	-	-	0.2	-	-	0.1	0

Intersection	
Intersection Delay, s/veh	93.1
Intersection LOS	F

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	59	435	35	61	601	76
Future Vol, veh/h	59	435	35	61	601	76
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	64	473	38	66	653	83
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	38.6	11.5	144.5
HCM LOS	E	B	F

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	59	435	35	61	601	76
LT Vol	59	0	0	0	601	0
Through Vol	0	435	35	0	0	0
RT Vol	0	0	0	61	0	76
Lane Flow Rate	64	473	38	66	653	83
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.127	0.873	0.08	0.126	1.278	0.134
Departure Headway (Hd)	7.867	7.353	8.323	7.594	7.045	5.832
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	459	496	433	475	523	618
Service Time	5.567	5.053	6.023	5.294	4.751	3.538
HCM Lane V/C Ratio	0.139	0.954	0.088	0.139	1.249	0.134
HCM Control Delay	11.7	42.3	11.7	11.4	161.6	9.4
HCM Lane LOS	B	E	B	B	F	A
HCM 95th-tile Q	0.4	9.4	0.3	0.4	26.9	0.5

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5

Timing Plan: AM

Intersection

Int Delay, s/veh 2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↑		↕	↑	
Traffic Vol, veh/h	5	5	2	1	0	1	17	86	125	262	801	14
Future Vol, veh/h	5	5	2	1	0	1	17	86	125	262	801	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	5	5	2	1	0	1	18	93	136	285	871	15






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1647	1714	878	1650	1653	161	886	0	0	229	0	0
Stage 1	1448	1448	-	198	198	-	-	-	-	-	-	-
Stage 2	199	266	-	1452	1455	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	80	91	350	80	99	889	773	-	-	1351	-	-
Stage 1	165	198	-	808	741	-	-	-	-	-	-	-
Stage 2	807	692	-	164	197	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	66	70	350	62	76	889	773	-	-	1351	-	-
Mov Cap-2 Maneuver	66	70	-	62	76	-	-	-	-	-	-	-
Stage 1	161	156	-	789	724	-	-	-	-	-	-	-
Stage 2	787	676	-	124	155	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60.2	36.6	0.7	2
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	773	-	-	78	116	1351	-
HCM Lane V/C Ratio	0.024	-	-	0.167	0.019	0.211	-
HCM Control Delay (s)	9.8	-	-	60.2	36.6	8.4	-
HCM Lane LOS	A	-	-	F	E	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	0.8	-





HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: AM

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	8	5	193	799	5
Future Vol, veh/h	33	8	5	193	799	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	36	9	5	210	868	5
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1092	871	874	0	-	0
Stage 1	871	-	-	-	-	-
Stage 2	221	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	240	353	781	-	-	-
Stage 1	413	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	238	353	781	-	-	-
Mov Cap-2 Maneuver	238	-	-	-	-	-
Stage 1	413	-	-	-	-	-
Stage 2	816	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	22.2	0.2		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	781	-	254	-	-	
HCM Lane V/C Ratio	0.007	-	0.175	-	-	
HCM Control Delay (s)	9.6	-	22.2	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.6	-	-	

HCM 2010 TWSC  
7: Lake Drive & Garage/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: AM








Intersection						
Int Delay, s/veh	2.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	9	12	185	141	268	537
Future Vol, veh/h	9	12	185	141	268	537
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	10	13	201	153	291	584
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	1444	278	0	0	354	0
Stage 1	278	-	-	-	-	-
Stage 2	1166	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	147	766	-	-	1216	-
Stage 1	774	-	-	-	-	-
Stage 2	299	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	112	766	-	-	1216	-
Mov Cap-2 Maneuver	112	-	-	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	227	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	23.3	0	3			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	219	1216	-	
HCM Lane V/C Ratio	-	-	0.104	0.24	-	
HCM Control Delay (s)	-	-	23.3	8.9	-	
HCM Lane LOS	-	-	C	A	-	
HCM 95th %tile Q(veh)	-	-	0.3	0.9	-	



HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Costco Buildings 4 and 5

Timing Plan: AM

Intersection												
Int Delay, s/veh	9.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	2	64	9	0	36	386	273	84	166	62	317
Future Vol, veh/h	19	2	64	9	0	36	386	273	84	166	62	317
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	21	2	70	10	0	39	420	297	91	180	67	345
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1802	1828	240	1818	1955	342	412	0	0	388	0	0
Stage 1	601	601	-	1182	1182	-	-	-	-	-	-	-
Stage 2	1201	1227	-	636	773	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	62	78	804	61	65	705	1158	-	-	1182	-	-
Stage 1	491	493	-	234	266	-	-	-	-	-	-	-
Stage 2	228	253	-	469	412	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	42	804	34	35	705	1158	-	-	1182	-	-
Mov Cap-2 Maneuver	37	42	-	34	35	-	-	-	-	-	-	-
Stage 1	313	418	-	149	170	-	-	-	-	-	-	-
Stage 2	137	161	-	361	349	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	78.2		42.7		5.1		2.6					
HCM LOS	F		E									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR				
Capacity (veh/h)	1158	-	-	133	143	1182	-	-				
HCM Lane V/C Ratio	0.362	-	-	0.695	0.342	0.153	-	-				
HCM Control Delay (s)	9.9	-	-	78.2	42.7	8.6	-	-				
HCM Lane LOS	A	-	-	F	E	A	-	-				
HCM 95th %tile Q(veh)	1.7	-	-	3.9	1.4	0.5	-	-				

# MOVEMENT SUMMARY

 **Site: [9. 62nd & Lake - 2026 AM With Project]**

Costco Buildings 4 and 5  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: SE 62nd St												
6	T1	630	1.0	0.956	4.5	LOS A	74.3	1871.5	0.21	0.36	0.21	37.5
16	R2	767	1.0	0.956	4.5	LOS A	74.3	1871.5	0.21	0.36	0.21	36.3
Approach		1397	1.0	0.956	4.5	LOS A	74.3	1871.5	0.21	0.36	0.21	36.9
North: Lake Dr												
7	L2	60	1.0	0.150	12.6	LOS B	0.8	20.9	0.61	0.72	0.61	35.1
14	R2	83	1.0	0.150	6.8	LOS A	0.8	20.9	0.61	0.72	0.61	34.0
Approach		144	1.0	0.150	9.2	LOS A	0.8	20.9	0.61	0.72	0.61	34.5
West: Lake Dr												
5	L2	1	1.0	0.044	9.9	LOS A	0.2	5.5	0.18	0.38	0.18	37.6
2	T1	60	1.0	0.044	4.0	LOS A	0.2	5.5	0.18	0.38	0.18	37.5
Approach		61	1.0	0.044	4.1	LOS A	0.2	5.5	0.18	0.38	0.18	37.5
All Vehicles		1602	1.0	0.956	4.9	LOS A	74.3	1871.5	0.25	0.39	0.25	36.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.




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Project: D:\Dropbox (TSI)\TSI Projects\2016\216055 costco hq 2017 site plan, access, parking\Analysis\2018-07-06 UPDATE - IN USE\2018-07-06 2026 62nd & Lake RAB.sip8

Intersection

Int Delay, s/veh 3.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	155	0	20	665	57	38
Future Vol, veh/h	155	0	20	665	57	38
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	168	0	22	723	62	41

Major/Minor	Major1	Major2	Minor2
Conflicting Flow All	745	0	0 720 383
Stage 1	-	-	- - 383 -
Stage 2	-	-	- - 337 -
Critical Hdwy	4.1	-	- - 6.4 6.2
Critical Hdwy Stg 1	-	-	- - 5.4 -
Critical Hdwy Stg 2	-	-	- - 5.4 -
Follow-up Hdwy	2.2	-	- - 3.5 3.3
Pot Cap-1 Maneuver	872	-	- - 398 669
Stage 1	-	-	- - 694 -
Stage 2	-	-	- - 728 -
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	872	-	- - 321 669
Mov Cap-2 Maneuver	-	-	- - 321 -
Stage 1	-	-	- - 694 -
Stage 2	-	-	- - 587 -

Approach	EB	WB	SB
HCM Control Delay, s	10.1	0	16.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	872	-	-	-	405
HCM Lane V/C Ratio	0.193	-	-	-	0.255
HCM Control Delay (s)	10.1	0	-	-	16.9
HCM Lane LOS	B	A	-	-	C
HCM 95th %tile Q(veh)	0.7	-	-	-	1

Queuing and Blocking Report  
2026 With-Project

Costco Buildings 4 and 5

Timing Plan: AM

Intersection: 1: 11th Ave NW/11th Ave & Lake Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	18	97	72	55	30	32	230	159
Average Queue (ft)	1	48	34	29	9	6	105	32
95th Queue (ft)	9	79	54	46	31	25	200	98
Link Distance (ft)		200	302		171	171	250	250
Upstream Blk Time (%)							1	0
Queuing Penalty (veh)							0	0
Storage Bay Dist (ft)	100			75				
Storage Blk Time (%)		0	0	0				
Queuing Penalty (veh)		0	0	0				

Intersection: 2: West Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	NB	SB
Directions Served	L	TR	L	LTR	LTR
Maximum Queue (ft)	13	4	34	55	24
Average Queue (ft)	0	0	9	19	1
95th Queue (ft)	6	3	32	47	12
Link Distance (ft)		302		96	102
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)	160		70		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 3: Building 2 Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	R	L	R
Maximum Queue (ft)	7	50	44	28	34	33	27
Average Queue (ft)	0	6	17	2	12	8	5
95th Queue (ft)	3	28	41	13	36	29	22
Link Distance (ft)		189		326	83	108	108
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)	70		50				
Storage Blk Time (%)		0	0	0			
Queuing Penalty (veh)		0	0	0			

Intersection: 4: Lake Drive & 10th Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	100	273	49	55	232	232
Average Queue (ft)	52	128	23	28	217	183
95th Queue (ft)	112	250	49	49	281	322
Link Distance (ft)		326	211		217	217
Upstream Blk Time (%)		0			79	31
Queuing Penalty (veh)		2			0	0
Storage Bay Dist (ft)	50			50		
Storage Blk Time (%)	1	54	0	0		
Queuing Penalty (veh)	4	32	0	0		

Intersection: 5: Lake Drive & Building 1 Driveway/Garage Driveway

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	39	30	31	19	61
Average Queue (ft)	8	2	9	1	29
95th Queue (ft)	31	15	31	9	54
Link Distance (ft)	76	87		378	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			50		75
Storage Blk Time (%)			0		0
Queuing Penalty (veh)			0		1

Intersection: 6: Lake Drive & Building 3 Driveway

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	73	24	9
Average Queue (ft)	29	3	0
95th Queue (ft)	61	18	9
Link Distance (ft)	99		378
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)		50	
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 7: Lake Drive & Garage/Trading Building Driveway

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (ft)	45	22	69	75
Average Queue (ft)	15	2	40	3
95th Queue (ft)	41	13	67	32
Link Distance (ft)	124	168		129
Upstream Blk Time (%)				0
Queuing Penalty (veh)				0
Storage Bay Dist (ft)			50	
Storage Blk Time (%)			3	
Queuing Penalty (veh)			15	

Intersection: 8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	82	70	98	194	66	47
Average Queue (ft)	38	26	62	15	28	12
95th Queue (ft)	70	53	97	96	54	34
Link Distance (ft)	96	84		298		168
Upstream Blk Time (%)	1	0		0		
Queuing Penalty (veh)	0	0		1		
Storage Bay Dist (ft)			50		50	
Storage Blk Time (%)			10	0	1	0
Queuing Penalty (veh)			35	0	3	0

Intersection: 9: 62nd St & Lake Drive

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	30	336	62
Average Queue (ft)	2	91	22
95th Queue (ft)	16	314	52
Link Distance (ft)	145	296	298
Upstream Blk Time (%)		10	
Queuing Penalty (veh)		0	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 10: 62nd St & Lot 5 Driveway

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	134	55	103
Average Queue (ft)	56	18	42
95th Queue (ft)	107	47	82
Link Distance (ft)	211	145	103
Upstream Blk Time (%)	0		1
Queuing Penalty (veh)	0		0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 44: 11th Ave/11th Ave NW & Red Robin Drwy

Movement	WB
Directions Served	LR
Maximum Queue (ft)	32
Average Queue (ft)	9
95th Queue (ft)	31
Link Distance (ft)	98
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 94
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Intersection	
Intersection Delay, s/veh	33
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑			↱	↱		↰			↰	
Traffic Vol, veh/h	103	193	64	17	352	442	153	253	26	15	24	72
Future Vol, veh/h	103	193	64	17	352	442	153	253	26	15	24	72
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	1	0	0	1	0	0	3	0	0	5	0
Mvmt Flow	112	210	70	18	383	480	166	275	28	16	26	78
Number of Lanes	1	1	0	0	1	1	0	2	0	0	2	0







Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	2
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	2	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	2	2	2	2
HCM Control Delay	21.1	45.1	25	13.7
HCM LOS	C	E	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	55%	0%	100%	0%	5%	0%	56%	0%
Vol Thru, %	45%	83%	0%	75%	95%	0%	44%	14%
Vol Right, %	0%	17%	0%	25%	0%	100%	0%	86%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	280	153	103	257	369	442	27	84
LT Vol	153	0	103	0	17	0	15	0
Through Vol	127	127	0	193	352	0	12	12
RT Vol	0	26	0	64	0	442	0	72
Lane Flow Rate	304	166	112	279	401	480	29	91
Geometry Grp	7	7	7	7	7	7	7	7
Degree of Util (X)	0.716	0.375	0.273	0.627	0.851	0.922	0.077	0.22
Departure Headway (Hd)	8.49	8.137	8.765	8.085	7.636	6.91	9.497	8.669
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	425	443	410	447	473	524	377	413
Service Time	6.247	5.894	6.532	5.852	5.396	4.67	7.271	6.443
HCM Lane V/C Ratio	0.715	0.375	0.273	0.624	0.848	0.916	0.077	0.22
HCM Control Delay	30	15.7	14.8	23.6	40.7	48.7	13.1	13.9
HCM Lane LOS	D	C	B	C	E	E	B	B
HCM 95th-tile Q	5.5	1.7	1.1	4.2	8.6	11.1	0.2	0.8



HCM 2010 TWSC  
2: West Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: PM








Intersection												
Int Delay, s/veh	5.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	188	18	39	683	61	56	1	10	42	1	62
Future Vol, veh/h	29	188	18	39	683	61	56	1	10	42	1	62
Conflicting Peds, #/hr	3	0	11	11	0	3	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	160	-	-	70	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	1	0	0	0	0	0	3	0	0	0	0
Mvmt Flow	31	202	19	42	734	66	60	1	11	45	1	67
Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	803	0	0	233	0	0	1170	1172	223	1134	1149	770
Stage 1	-	-	-	-	-	-	285	285	-	854	854	-
Stage 2	-	-	-	-	-	-	885	887	-	280	295	-
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.53	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.53	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4.027	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	830	-	-	1346	-	-	171	191	822	181	200	404
Stage 1	-	-	-	-	-	-	727	674	-	356	378	-
Stage 2	-	-	-	-	-	-	342	361	-	731	673	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	830	-	-	1346	-	-	134	176	814	168	184	403
Mov Cap-2 Maneuver	-	-	-	-	-	-	134	176	-	168	184	-
Stage 1	-	-	-	-	-	-	693	643	-	342	365	-
Stage 2	-	-	-	-	-	-	276	349	-	693	642	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	1.2			0.4			47.4			29.5		
HCM LOS							E			D		
Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)	154	830	-	-	1346	-	-	257				
HCM Lane V/C Ratio	0.468	0.038	-	-	0.031	-	-	0.439				
HCM Control Delay (s)	47.4	9.5	-	-	7.8	-	-	29.5				
HCM Lane LOS	E	A	-	-	A	-	-	D				
HCM 95th %tile Q(veh)	2.2	0.1	-	-	0.1	-	-	2.1				

HCM 2010 TWSC  
3: Building 2 Driveway/Warehouse & Lake Drive

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection

Int Delay, s/veh 5.6







Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	36	195	10	33	653	53	0	0	115	70	0	131
Future Vol, veh/h	36	195	10	33	653	53	0	0	115	70	0	131
Conflicting Peds, #/hr	2	0	1	1	0	2	26	0	0	0	0	26
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	70	-	-	50	-	-	-	-	0	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	1	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	38	205	11	35	687	56	0	0	121	74	0	138

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	745	0	0	217	0	0	-	-	212	1073	-	743
Stage 1	-	-	-	-	-	-	-	-	-	787	-	-
Stage 2	-	-	-	-	-	-	-	-	-	286	-	-
Critical Hdwy	4.1	-	-	4.1	-	-	-	-	6.2	7.1	-	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.1	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.1	-	-
Follow-up Hdwy	2.2	-	-	2.2	-	-	-	-	3.3	3.5	-	3.3
Pot Cap-1 Maneuver	872	-	-	1365	-	-	0	0	833	200	0	418
Stage 1	-	-	-	-	-	-	0	0	-	388	0	-
Stage 2	-	-	-	-	-	-	0	0	-	726	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	853	-	-	1365	-	-	-	-	832	162	-	408
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	162	-	-
Stage 1	-	-	-	-	-	-	-	-	-	370	-	-
Stage 2	-	-	-	-	-	-	-	-	-	593	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.3	10.1	27.4
HCM LOS			B	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	832	853	-	-	1365	-	-	162	408
HCM Lane V/C Ratio	0.145	0.044	-	-	0.025	-	-	0.455	0.338
HCM Control Delay (s)	10.1	9.4	-	-	7.7	-	-	44.5	18.3
HCM Lane LOS	B	A	-	-	A	-	-	E	C
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0.1	-	-	2.1	1.5

Intersection	
Intersection Delay, s/veh	24.3
Intersection LOS	C

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	260	132	485	528	44	131
Future Vol, veh/h	260	132	485	528	44	131
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	283	143	527	574	48	142
Number of Lanes	1	1	1	1	1	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	15.9	29.6	12.1
HCM LOS	C	D	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	0%	100%	0%
Vol Thru, %	0%	100%	100%	0%	0%	0%
Vol Right, %	0%	0%	0%	100%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	260	132	485	528	44	131
LT Vol	260	0	0	0	44	0
Through Vol	0	132	485	0	0	0
RT Vol	0	0	0	528	0	131
Lane Flow Rate	283	143	527	574	48	142
Geometry Grp	7	7	7	7	7	7
Degree of Util (X)	0.551	0.26	0.851	0.814	0.108	0.272
Departure Headway (Hd)	7.023	6.514	5.813	5.104	8.108	6.882
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes
Cap	512	550	622	706	441	521
Service Time	4.786	4.277	3.558	2.849	5.869	4.642
HCM Lane V/C Ratio	0.553	0.26	0.847	0.813	0.109	0.273
HCM Control Delay	18.1	11.6	33.1	26.3	11.9	12.2
HCM Lane LOS	C	B	D	D	B	B
HCM 95th-tile Q	3.3	1	9.4	8.6	0.4	1.1

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5

Timing Plan: PM

Intersection												
Int Delay, s/veh	12.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	58	1	12	51	9	134	19	804	1	3	153	16
Future Vol, veh/h	58	1	12	51	9	134	19	804	1	3	153	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	63	1	13	55	10	146	21	874	1	3	166	17

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1175	1098	175	1105	1106	874	184	0	0	875	0	0
Stage 1	182	182	-	916	916	-	-	-	-	-	-	-
Stage 2	993	916	-	189	190	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	170	215	874	190	212	352	1403	-	-	780	-	-
Stage 1	824	753	-	329	354	-	-	-	-	-	-	-
Stage 2	298	354	-	817	747	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	95	211	874	184	208	352	1403	-	-	780	-	-
Mov Cap-2 Maneuver	95	211	-	184	208	-	-	-	-	-	-	-
Stage 1	812	750	-	324	349	-	-	-	-	-	-	-
Stage 2	167	349	-	801	744	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	87.5		49.9		0.2		0.2	
HCM LOS	F		E					






Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	113	277	780	-
HCM Lane V/C Ratio	0.015	-	-	0.683	0.761	0.004	-
HCM Control Delay (s)	7.6	-	-	87.5	49.9	9.6	-
HCM Lane LOS	A	-	-	F	E	A	-
HCM 95th %tile Q(veh)	0	-	-	3.6	5.7	0	-

HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection

Int Delay, s/veh 0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	13	14	796	210	6
Future Vol, veh/h	28	13	14	796	210	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	30	14	15	865	228	7





Major/Minor	Minor2	Major1	Major2
Conflicting Flow All	1128	232	235
Stage 1	232	-	-
Stage 2	896	-	-
Critical Hdwy	6.4	6.2	4.1
Critical Hdwy Stg 1	5.4	-	-
Critical Hdwy Stg 2	5.4	-	-
Follow-up Hdwy	3.5	3.3	2.2
Pot Cap-1 Maneuver	228	812	1344
Stage 1	811	-	-
Stage 2	402	-	-
Platoon blocked, %			
Mov Cap-1 Maneuver	225	812	1344
Mov Cap-2 Maneuver	225	-	-
Stage 1	811	-	-
Stage 2	398	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.5	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1344	-	292	-	-
HCM Lane V/C Ratio	0.011	-	0.153	-	-
HCM Control Delay (s)	7.7	-	19.5	-	-
HCM Lane LOS	A	-	C	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-







HCM 2010 TWSC  
7: Lake Drive & Garage/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection						
Int Delay, s/veh	50.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	183	257	553	12	24	199
Future Vol, veh/h	183	257	553	12	24	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	199	279	601	13	26	216
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	876	608	0	0	614	0
Stage 1	608	-	-	-	-	-
Stage 2	268	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	322	499	-	-	975	-
Stage 1	547	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	313	499	-	-	975	-
Mov Cap-2 Maneuver	313	-	-	-	-	-
Stage 1	547	-	-	-	-	-
Stage 2	761	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	140.4	0		0.9		
HCM LOS	F					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	400		975	-	
HCM Lane V/C Ratio	-	1.196		0.027	-	
HCM Control Delay (s)	-	140.4		8.8	-	
HCM Lane LOS	-	F		A	-	
HCM 95th %tile Q(veh)	-	19.1		0.1	-	

HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	102.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	149	0	312	66	3	195	68	221	13	36	334	12
Future Vol, veh/h	149	0	312	66	3	195	68	221	13	36	334	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	162	0	339	72	3	212	74	240	14	39	363	13
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	951	850	370	1012	849	247	376	0	0	254	0	0
Stage 1	448	448	-	395	395	-	-	-	-	-	-	-
Stage 2	503	402	-	617	454	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	242	300	680	220	300	797	1194	-	-	1323	-	-
Stage 1	594	576	-	634	608	-	-	-	-	-	-	-
Stage 2	555	604	-	481	573	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	164	273	680	103	273	797	1194	-	-	1323	-	-
Mov Cap-2 Maneuver	164	273	-	103	273	-	-	-	-	-	-	-
Stage 1	557	559	-	595	570	-	-	-	-	-	-	-
Stage 2	380	567	-	234	556	-	-	-	-	-	-	-
Approach	EB		WB		NB		SB					
HCM Control Delay, s	263.6		84.4		1.8		0.7					
HCM LOS	F		F									
Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR					
Capacity (veh/h)	1194	-	-	337	295	1323	-	-				
HCM Lane V/C Ratio	0.062	-	-	1.487	0.973	0.03	-	-				
HCM Control Delay (s)	8.2	-	-	263.6	84.4	7.8	-	-				
HCM Lane LOS	A	-	-	F	F	A	-	-				
HCM 95th %tile Q(veh)	0.2	-	-	27.4	9.9	0.1	-	-				

# MOVEMENT SUMMARY

 **Site: [9. 62nd & Lake - 2026 PM With Project]**

Costco Buildings 4 and 5  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: SE 62nd St												
6	T1	139	2.0	0.332	4.0	LOS A	2.1	54.2	0.21	0.43	0.21	37.5
16	R2	322	2.0	0.332	4.1	LOS A	2.1	54.2	0.21	0.43	0.21	36.3
Approach		461	2.0	0.332	4.1	LOS A	2.1	54.2	0.21	0.43	0.21	36.7
North: Lake Dr												
7	L2	446	2.0	0.463	10.6	LOS B	3.1	78.3	0.39	0.62	0.39	34.9
14	R2	160	2.0	0.463	4.7	LOS A	3.1	78.3	0.39	0.62	0.39	33.8
Approach		605	2.0	0.463	9.0	LOS A	3.1	78.3	0.39	0.62	0.39	34.6
West: Lake Dr												
5	L2	48	2.0	0.149	11.6	LOS B	0.8	20.4	0.53	0.62	0.53	35.5
2	T1	109	2.0	0.149	5.7	LOS A	0.8	20.4	0.53	0.62	0.53	35.5
Approach		157	2.0	0.149	7.5	LOS A	0.8	20.4	0.53	0.62	0.53	35.5
All Vehicles		1223	2.0	0.463	7.0	LOS A	3.1	78.3	0.34	0.55	0.34	35.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).




HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: TRANSPORTATION SOLUTIONS INC | Processed: Wednesday, July 11, 2018 11:15:52 PM

Project: D:\Dropbox (TSI)\TSI Projects\2016\216055 costco hq 2017 site plan, access, parking\Analysis\2018-07-06 UPDATE - IN USE\2018-07-06 2026 62nd & Lake RAB.sip8



Intersection						
Int Delay, s/veh	20.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	44	100	62	79	410	147
Future Vol, veh/h	44	100	62	79	410	147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	48	109	67	86	446	160
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	153	0	-	0	314	110
Stage 1	-	-	-	-	110	-
Stage 2	-	-	-	-	204	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1440	-	-	-	683	949
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	835	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1440	-	-	-	659	949
Mov Cap-2 Maneuver	-	-	-	-	659	-
Stage 1	-	-	-	-	920	-
Stage 2	-	-	-	-	806	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.3	0		31		
HCM LOS				D		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1440	-	-	-	717	
HCM Lane V/C Ratio	0.033	-	-	-	0.844	
HCM Control Delay (s)	7.6	0	-	-	31	
HCM Lane LOS	A	A	-	-	D	
HCM 95th %tile Q(veh)	0.1	-	-	-	9.6	

Intersection: 1: 11th Ave NW/11th Ave & Lake Drive

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	LT	R	LT	TR	LT	TR
Maximum Queue (ft)	73	109	273	125	148	106	58	63
Average Queue (ft)	33	51	102	90	73	42	23	30
95th Queue (ft)	59	89	209	139	119	78	50	52
Link Distance (ft)		200	302		171	171	250	250
Upstream Blk Time (%)			0		0	0		
Queuing Penalty (veh)			2		0	0		
Storage Bay Dist (ft)	100			75				
Storage Blk Time (%)	0	0	16	11				
Queuing Penalty (veh)	0	0	72	42				

Intersection: 2: West Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	40	2	33	63	88	109
Average Queue (ft)	13	0	6	3	39	52
95th Queue (ft)	36	1	27	31	75	95
Link Distance (ft)		302		189	96	102
Upstream Blk Time (%)				0	1	3
Queuing Penalty (veh)				0	0	0
Storage Bay Dist (ft)	160		70			
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 3: Building 2 Driveway/Warehouse & Lake Drive

Movement	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	TR	R	L	R
Maximum Queue (ft)	42	23	32	68	74	102	98
Average Queue (ft)	15	2	6	9	39	40	47
95th Queue (ft)	37	13	26	37	65	79	81
Link Distance (ft)		189		326	83	108	108
Upstream Blk Time (%)					0	0	0
Queuing Penalty (veh)					0	0	0
Storage Bay Dist (ft)	70		50				
Storage Blk Time (%)	0		0	0			
Queuing Penalty (veh)	0		0	0			

Intersection: 4: Lake Drive & 10th Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	82	58	190	100	48	74
Average Queue (ft)	48	33	90	85	21	35
95th Queue (ft)	72	46	158	112	43	62
Link Distance (ft)		326	211		217	217
Upstream Blk Time (%)			0			
Queuing Penalty (veh)			1			
Storage Bay Dist (ft)	50			50		
Storage Blk Time (%)	5	1	25	16		
Queuing Penalty (veh)	7	2	132	79		

Intersection: 5: Lake Drive & Building 1 Driveway/Garage Driveway

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (ft)	89	102	38	34	24
Average Queue (ft)	49	96	3	1	2
95th Queue (ft)	91	121	20	20	13
Link Distance (ft)	76	87		378	
Upstream Blk Time (%)	14	72			
Queuing Penalty (veh)	0	0			
Storage Bay Dist (ft)			50		75
Storage Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	

Intersection: 6: Lake Drive & Building 3 Driveway

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	55	30
Average Queue (ft)	25	2
95th Queue (ft)	52	14
Link Distance (ft)	99	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		50
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 7: Lake Drive & Garage/Trading Building Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (ft)	139	10	36
Average Queue (ft)	128	0	11
95th Queue (ft)	168	6	35
Link Distance (ft)	124	168	
Upstream Blk Time (%)	57		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			50
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Intersection: 8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	L
Maximum Queue (ft)	111	99	45	30
Average Queue (ft)	105	69	18	7
95th Queue (ft)	128	106	45	26
Link Distance (ft)	96	84		
Upstream Blk Time (%)	52	7		
Queuing Penalty (veh)	0	0		
Storage Bay Dist (ft)			50	50
Storage Blk Time (%)			0	0
Queuing Penalty (veh)			0	0

Intersection: 9: 62nd St & Lake Drive

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	158	42	208
Average Queue (ft)	100	2	83
95th Queue (ft)	172	19	186
Link Distance (ft)	145	296	298
Upstream Blk Time (%)	4		
Queuing Penalty (veh)	20		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report  
2026 With-Project

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection: 10: 62nd St & Lot 5 Driveway

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	59	2	118
Average Queue (ft)	9	0	109
95th Queue (ft)	35	2	138
Link Distance (ft)	211	145	103
Upstream Blk Time (%)			35
Queuing Penalty (veh)			0
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 44: 11th Ave/11th Ave NW & Red Robin Drwy

Movement	WB	NB	SB
Directions Served	LR	T	LT
Maximum Queue (ft)	66	10	38
Average Queue (ft)	34	1	7
95th Queue (ft)	56	13	30
Link Distance (ft)	98	243	171
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary













Network wide Queuing Penalty: 359
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# HCM 2010 Signalized Intersection Summary

## 4: Lake Drive & 10th Ave

Costco Buildings 4 and 5

Timing Plan: AM

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	59	435	35	61	601	76		
Future Volume (veh/h)	59	435	35	61	601	76		
Number	7	4	8	18	1	16		
Initial Q (Ob), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	64	473	38	66	653	83		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	482	663	323	275	755	674		
Arrive On Green	0.06	0.35	0.17	0.17	0.42	0.42		
Sat Flow, veh/h	1810	1900	1900	1615	1810	1615		
Grp Volume(v), veh/h	64	473	38	66	653	83		
Grp Sat Flow(s),veh/h/ln	1810	1900	1900	1615	1810	1615		
Q Serve(g_s), s	1.1	9.2	0.7	1.5	14.1	1.4		
Cycle Q Clear(g_c), s	1.1	9.2	0.7	1.5	14.1	1.4		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	482	663	323	275	755	674		
V/C Ratio(X)	0.13	0.71	0.12	0.24	0.86	0.12		
Avail Cap(c_a), veh/h	707	1819	1242	1056	1014	905		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	11.6	12.1	15.0	15.4	11.4	7.7		
Incr Delay (d2), s/veh	0.1	1.4	0.2	0.4	6.1	0.1		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%),veh/ln	0.6	5.0	0.4	0.7	8.2	1.6		
LnGrp Delay(d),s/veh	11.8	13.5	15.2	15.8	17.5	7.7		
LnGrp LOS	B	B	B	B	B	A		
Approach Vol, veh/h		537	104		736			
Approach Delay, s/veh		13.3	15.6		16.4			
Approach LOS		B	B		B			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				20.0		22.9	7.7	12.3
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				41.0		24.0	8.0	28.0
Max Q Clear Time (g_c+I1), s				11.2		16.1	3.1	3.5
Green Ext Time (p_c), s				3.7		1.8	0.0	3.6
Intersection Summary								
HCM 2010 Ctrl Delay			15.1					
HCM 2010 LOS			B					

Intersection: 4: Lake Drive & 10th Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	100	212	57	54	232	185
Average Queue (ft)	32	117	18	24	181	31
95th Queue (ft)	83	186	49	50	268	104
Link Distance (ft)		326	211	211	217	217
Upstream Blk Time (%)					12	0
Queuing Penalty (veh)					0	0
Storage Bay Dist (ft)	50					
Storage Blk Time (%)	1	27				
Queuing Penalty (veh)	6	16				

# MOVEMENT SUMMARY

 **Site: [4. 10th & Lake - 2026 AM With Project - Single Lane RAB]**

Costco Buildings 4 and 5  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Lake Dr												
6	T1	66	0.0	0.076	4.0	LOS A	0.4	10.2	0.20	0.40	0.20	37.5
16	R2	39	0.0	0.076	4.1	LOS A	0.4	10.2	0.20	0.40	0.20	36.4
Approach		105	0.0	0.076	4.0	LOS A	0.4	10.2	0.20	0.40	0.20	37.1
North: 10th Ave NW												
7	L2	653	0.0	0.523	10.2	LOS B	3.9	97.9	0.28	0.60	0.28	34.7
14	R2	83	0.0	0.523	4.3	LOS A	3.9	97.9	0.28	0.60	0.28	33.6
Approach		736	0.0	0.523	9.5	LOS A	3.9	97.9	0.28	0.60	0.28	34.6
West: Lake Dr												
5	L2	64	0.0	0.568	15.4	LOS B	5.1	127.4	0.81	0.90	0.98	34.7
2	T1	473	0.0	0.568	9.4	LOS A	5.1	127.4	0.81	0.90	0.98	34.6
Approach		537	0.0	0.568	10.1	LOS B	5.1	127.4	0.81	0.90	0.98	34.6
All Vehicles		1378	0.0	0.568	9.3	LOS A	5.1	127.4	0.48	0.70	0.55	34.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.















# HCM 2010 Signalized Intersection Summary

## 4: Lake Drive & 10th Ave

Costco Buildings 4 and 5

Timing Plan: PM

								
Movement	EBL	EBT	WBT	WBR	SBL	SBR		
Lane Configurations								
Traffic Volume (veh/h)	260	132	485	528	44	131		
Future Volume (veh/h)	260	132	485	528	44	131		
Number	7	4	8	18	1	16		
Initial Q (Qb), veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/ln	1900	1900	1900	1900	1900	1900		
Adj Flow Rate, veh/h	283	143	527	574	48	142		
Adj No. of Lanes	1	1	1	1	1	1		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92		
Percent Heavy Veh, %	0	0	0	0	0	0		
Cap, veh/h	478	1243	814	692	240	214		
Arrive On Green	0.12	0.65	0.43	0.43	0.13	0.13		
Sat Flow, veh/h	1810	1900	1900	1615	1810	1615		
Grp Volume(v), veh/h	283	143	527	574	48	142		
Grp Sat Flow(s),veh/h/ln	1810	1900	1900	1615	1810	1615		
Q Serve(g_s), s	3.6	1.3	10.3	14.8	1.1	3.9		
Cycle Q Clear(g_c), s	3.6	1.3	10.3	14.8	1.1	3.9		
Prop In Lane	1.00			1.00	1.00	1.00		
Lane Grp Cap(c), veh/h	478	1243	814	692	240	214		
V/C Ratio(X)	0.59	0.12	0.65	0.83	0.20	0.66		
Avail Cap(c_a), veh/h	610	1704	1136	966	1082	966		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	8.0	3.0	10.6	11.9	18.1	19.3		
Incr Delay (d2), s/veh	0.4	0.0	0.3	3.1	0.2	1.3		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(95%),veh/ln	3.2	1.2	9.1	11.5	1.0	6.3		
LnGrp Delay(d),s/veh	8.4	3.0	10.9	15.0	18.3	20.7		
LnGrp LOS	A	A	B	B	B	C		
Approach Vol, veh/h		426	1101		190			
Approach Delay, s/veh		6.6	13.0		20.0			
Approach LOS		A	B		C			
Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				35.6		11.2	10.6	25.1
Change Period (Y+Rc), s				5.0		5.0	5.0	5.0
Max Green Setting (Gmax), s				42.0		28.0	9.0	28.0
Max Q Clear Time (g_c+I1), s				3.3		5.9	5.6	16.8
Green Ext Time (p_c), s				4.3		0.3	0.2	3.3
Intersection Summary								
HCM 2010 Ctrl Delay			12.2					
HCM 2010 LOS			B					

HCM 2010 TWSC  
5: Lake Drive & Building 1 Driveway/Garage Driveway

Costco Buildings 4 and 5

Timing Plan: PM

Intersection												
Int Delay, s/veh	25.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	58	1	12	51	9	234	19	704	1	3	153	16
Future Vol, veh/h	58	1	12	51	9	234	19	704	1	3	153	16
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	75	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	63	1	13	55	10	254	21	765	1	3	166	17






Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1121	990	175	996	997	766	184	0	0	766	0	0
Stage 1	182	182	-	807	807	-	-	-	-	-	-	-
Stage 2	939	808	-	189	190	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	185	248	874	225	246	406	1403	-	-	856	-	-
Stage 1	824	753	-	378	397	-	-	-	-	-	-	-
Stage 2	320	397	-	817	747	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	66	243	874	218	241	406	1403	-	-	856	-	-
Mov Cap-2 Maneuver	66	243	-	218	241	-	-	-	-	-	-	-
Stage 1	812	750	-	372	391	-	-	-	-	-	-	-
Stage 2	115	391	-	801	744	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	187	65.5	0.2	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1403	-	-	79 347	856	-	-
HCM Lane V/C Ratio	0.015	-	-	0.977 0.921	0.004	-	-
HCM Control Delay (s)	7.6	-	-	187 65.5	9.2	-	-
HCM Lane LOS	A	-	-	F F	A	-	-
HCM 95th %tile Q(veh)	0	-	-	5.3 9.4	0	-	-





HCM 2010 TWSC  
6: Lake Drive & Building 3 Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection						
Int Delay, s/veh	0.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	13	14	696	210	6
Future Vol, veh/h	28	13	14	696	210	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	30	14	15	757	228	7
Major/Minor	Minor2	Major1		Major2		
Conflicting Flow All	1019	232	235	0	-	0
Stage 1	232	-	-	-	-	-
Stage 2	787	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	265	812	1344	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	452	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	262	812	1344	-	-	-
Mov Cap-2 Maneuver	262	-	-	-	-	-
Stage 1	811	-	-	-	-	-
Stage 2	447	-	-	-	-	-
Approach	EB	NB		SB		
HCM Control Delay, s	17.4	0.2		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR	
Capacity (veh/h)	1344	-	334	-	-	
HCM Lane V/C Ratio	0.011	-	0.133	-	-	
HCM Control Delay (s)	7.7	-	17.4	-	-	
HCM Lane LOS	A	-	C	-	-	
HCM 95th %tile Q(veh)	0	-	0.5	-	-	

HCM 2010 TWSC  
7: Lake Drive & Garage/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection						
Int Delay, s/veh	14.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	133	207	503	12	24	199
Future Vol, veh/h	133	207	503	12	24	199
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	145	225	547	13	26	216
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	821	553	0	0	560	0
Stage 1	553	-	-	-	-	-
Stage 2	268	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	347	537	-	-	1021	-
Stage 1	580	-	-	-	-	-
Stage 2	782	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	338	537	-	-	1021	-
Mov Cap-2 Maneuver	338	-	-	-	-	-
Stage 1	580	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	44.7	0		0.9		
HCM LOS	E					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	436	1021	-	
HCM Lane V/C Ratio	-	-	0.848	0.026	-	
HCM Control Delay (s)	-	-	44.7	8.6	-	
HCM Lane LOS	-	-	E	A	-	
HCM 95th %tile Q(veh)	-	-	8.3	0.1	-	

HCM 2010 TWSC  
8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Costco Buildings 4 and 5  
Timing Plan: PM

Intersection												
Int Delay, s/veh	24.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	50	0	411	17	3	244	68	221	13	36	284	12
Future Vol, veh/h	50	0	411	17	3	244	68	221	13	36	284	12
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	50	-	-	50	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	0	0	0	0	0	0	0
Mvmt Flow	54	0	447	18	3	265	74	240	14	39	309	13

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	922	795	315	1012	795	247	322	0	0	254	0	0
Stage 1	393	393	-	395	395	-	-	-	-	-	-	-
Stage 2	529	402	-	617	400	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	253	323	730	220	323	797	1249	-	-	1323	-	-
Stage 1	636	609	-	634	608	-	-	-	-	-	-	-
Stage 2	537	604	-	481	605	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	156	295	730	80	295	797	1249	-	-	1323	-	-
Mov Cap-2 Maneuver	156	295	-	80	295	-	-	-	-	-	-	-
Stage 1	598	591	-	596	572	-	-	-	-	-	-	-
Stage 2	335	568	-	181	587	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	58.2		21.5		1.8		0.8	
HCM LOS	F		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1249	-	-	522 499	1323	-	-
HCM Lane V/C Ratio	0.059	-	-	0.96 0.575	0.03	-	-
HCM Control Delay (s)	8.1	-	-	58.2 21.5	7.8	-	-
HCM Lane LOS	A	-	-	F C	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	12.5 3.6	0.1	-	-

Intersection: 4: Lake Drive & 10th Ave

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	L	R
Maximum Queue (ft)	98	144	223	142	66	84
Average Queue (ft)	65	36	123	71	23	38
95th Queue (ft)	98	94	197	112	55	68
Link Distance (ft)		326	211	211	217	217
Upstream Blk Time (%)			1	0		
Queuing Penalty (veh)			3	0		
Storage Bay Dist (ft)	50					
Storage Blk Time (%)	16	1				
Queuing Penalty (veh)	21	3				

Intersection: 5: Lake Drive & Building 1 Driveway/Garage Driveway

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (ft)	81	89	36	59	22	2
Average Queue (ft)	38	80	2	3	2	0
95th Queue (ft)	68	105	18	29	13	2
Link Distance (ft)	76	74		378		211
Upstream Blk Time (%)	2	38				
Queuing Penalty (veh)	0	0				
Storage Bay Dist (ft)			50		75	
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 6: Lake Drive & Building 3 Driveway

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	61	30
Average Queue (ft)	24	3
95th Queue (ft)	52	18
Link Distance (ft)	99	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		50
Storage Blk Time (%)		0
Queuing Penalty (veh)		0

Intersection: 7: Lake Drive & Garage/Trading Building Driveway

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (ft)	139	4	34
Average Queue (ft)	97	0	9
95th Queue (ft)	155	3	32
Link Distance (ft)	124	168	
Upstream Blk Time (%)	13		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			50
Storage Blk Time (%)			0
Queuing Penalty (veh)			0

Intersection: 8: Lake Drive & Lot 5 Driveway/Trading Building Driveway

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	L	L	TR
Maximum Queue (ft)	111	99	44	31	5
Average Queue (ft)	100	65	18	6	0
95th Queue (ft)	129	102	44	26	5
Link Distance (ft)	96	84			168
Upstream Blk Time (%)	24	3			
Queuing Penalty (veh)	0	0			
Storage Bay Dist (ft)			50	50	
Storage Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	

# MOVEMENT SUMMARY

 **Site: [4. 10th & Lake - 2026 PM With Project - Single Lane RAB]**

Costco Buildings 4 and 5  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
East: Lake Dr												
6	T1	527	0.0	0.902	12.6	LOS B	19.3	482.4	1.00	0.97	1.36	33.2
16	R2	574	0.0	0.902	12.7	LOS B	19.3	482.4	1.00	0.97	1.36	32.3
Approach		1101	0.0	0.902	12.6	LOS B	19.3	482.4	1.00	0.97	1.36	32.8
North: 10th Ave NW												
7	L2	48	0.0	0.206	12.0	LOS B	1.4	34.2	0.69	0.71	0.69	35.7
14	R2	142	0.0	0.206	6.1	LOS A	1.4	34.2	0.69	0.71	0.69	34.5
Approach		190	0.0	0.206	7.6	LOS A	1.4	34.2	0.69	0.71	0.69	34.8
West: Lake Dr												
5	L2	283	0.0	0.301	9.9	LOS A	2.0	49.1	0.21	0.56	0.21	35.6
2	T1	143	0.0	0.301	4.0	LOS A	2.0	49.1	0.21	0.56	0.21	35.5
Approach		426	0.0	0.301	7.9	LOS A	2.0	49.1	0.21	0.56	0.21	35.5
All Vehicles		1717	0.0	0.902	10.9	LOS B	19.3	482.4	0.77	0.84	1.00	33.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Signalised Intersections.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Project: Not Saved